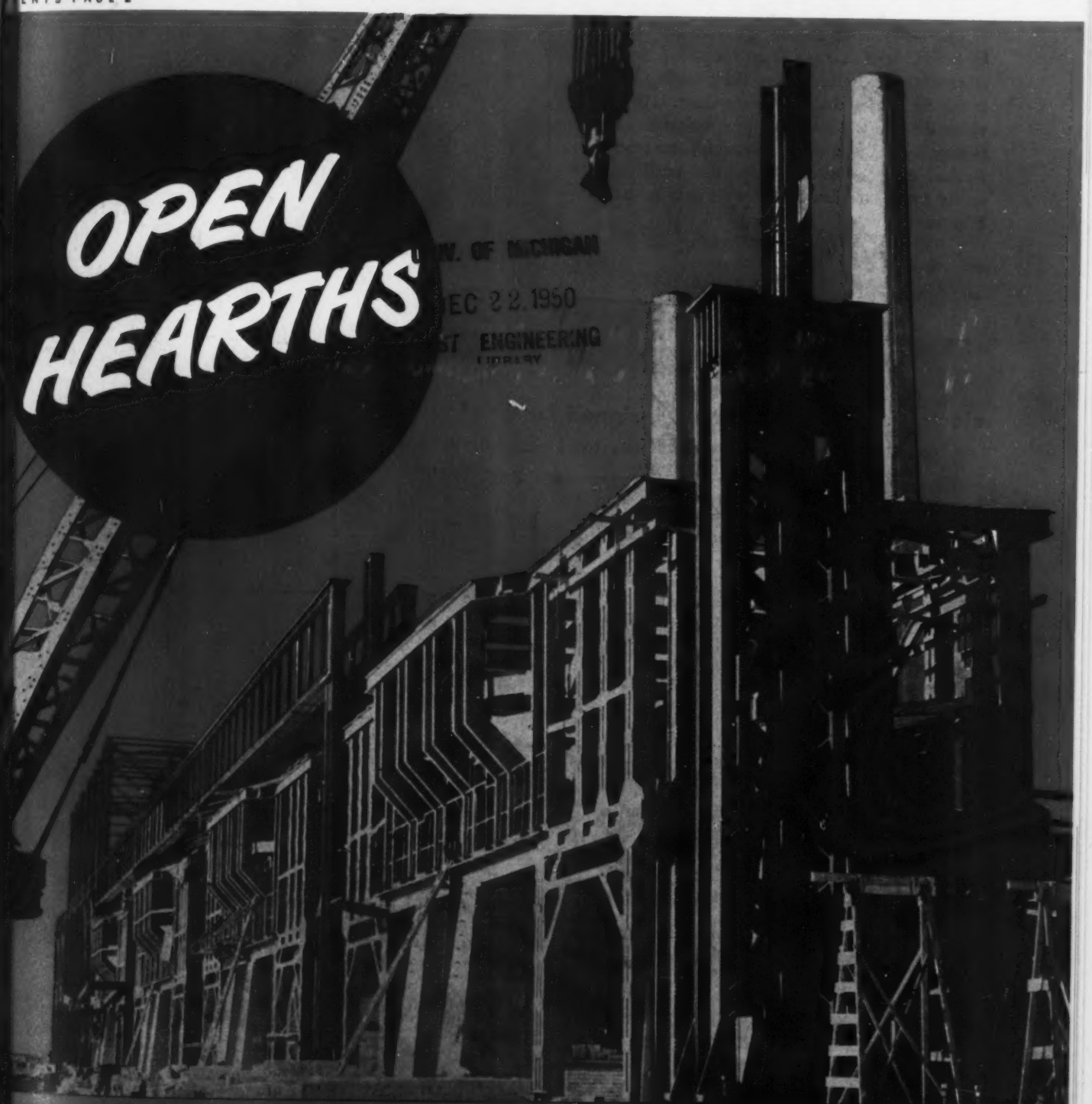
A CHILTON PUBLICATION

The Iron Age

E NATIONAL METALWORKING WEEKLY

December 21, 1950

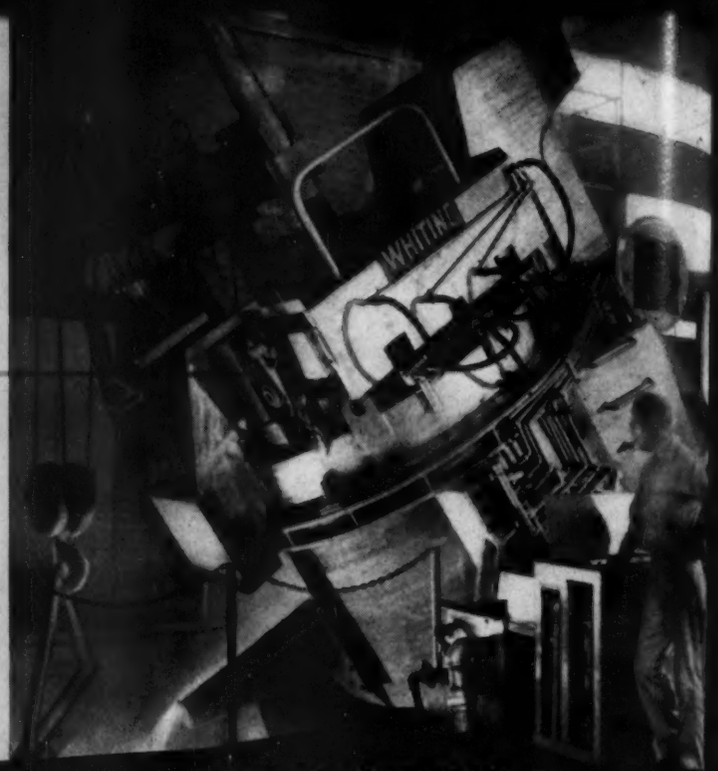
ENTS PAGE 2



delivers uniform steel at lower cost

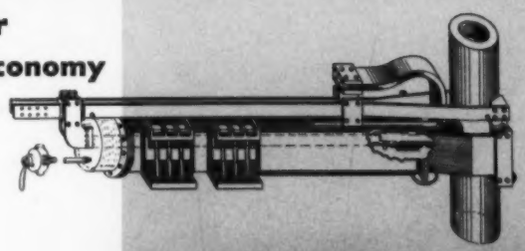
by reducing surging and transformer heating . . . thus improving power factor and lowering power cost

The Whiting Hydro-Arc Furnace employs hydraulic power transmission for positioning electrodes, thus eliminating the time-lag between demand and electrode response. It provides definitely controlled production on a more efficient basis and delivers uniform steel worked under ideal conditions that until recently were considered obtainable only in the laboratory.



WHITING hydro-arc electric furnace

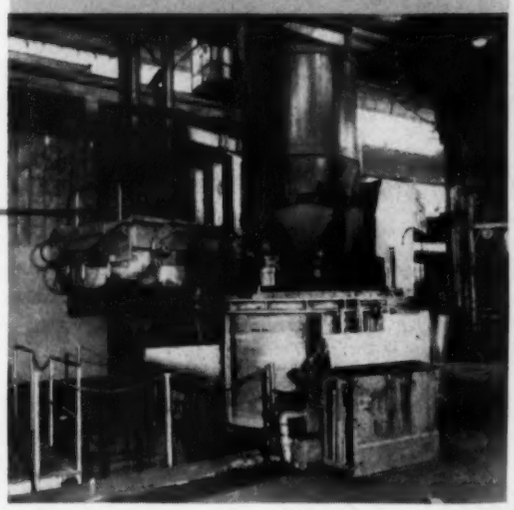
electrode arms and clamps designed for greater safety, convenience, and economy



The electrode arms and clamps are an important feature of Hydro-Arc construction. Melters need not climb over the furnace into oppressive heat and fumes to slip electrodes—they can be slipped from the floor by merely pressing a lever. Electrodes can be adjusted in less than 30 seconds.

top-charging for further economy and increased output

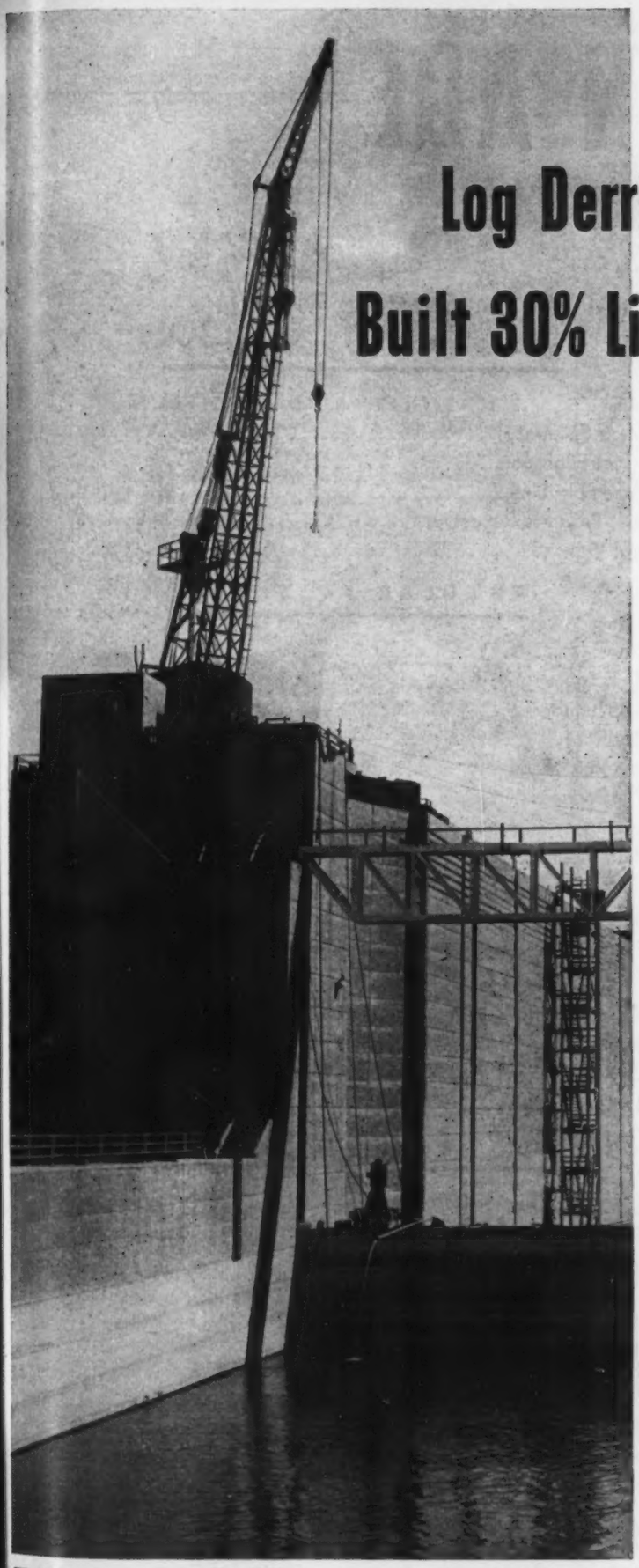
Top-Charging Hydro-Arc Furnaces provide additional savings. The roof, suspended at four points, swings aside while the charging bucket lowers into the furnace and discharges without jarring or damaging refractories. The furnace can be completely charged in 5 to 7 minutes after tapping, making "down time" negligible, reducing costs, and increasing the number of melts per day.



WHITING CORPORATION

15601 LATHROP AVENUE, HARVEY, ILL.

Offices in Chicago, Cincinnati, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Representatives in other principal cities. Canadian subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church Street, New York 7, New York.



Log Derrick for McNary Dam Built 30% Lighter with Mayari R

The 56-ft mast and 60-ft boom of this new log derrick at McNary Dam were built from Bethlehem's Mayari R low-alloy, high-strength steel. Used for placing temporary gates in the spillways when removal or repair of the permanent gates is necessary, this derrick will lift a load of 80,000 lb with the boom in a horizontal position. The use of Mayari R enabled the designers to provide this lifting capacity and at the same time reduce the deadweight of the machine by 30 pct.

Mayari R has more than 1½ times the yield point of structural-grade carbon steel, permitting the use of higher working stresses to reduce deadload. It also has 5 to 6 times the resistance to atmospheric corrosion of carbon steel, which means that equal or better service life can be expected even though lighter sections of Mayari R are used.

Other important advantages of this versatile steel include superior paint-retention and better resistance to abrasion, battering and denting. It is used in the as-rolled condition, requiring no heat-treatment and no special shop equipment for fabrication.

More information on Mayari R is yours for the asking. Write or phone for Catalog 259.

◀ Mayari R log derrick for McNary Dam designed and fabricated by the Washington Iron Works, Seattle.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R *makes it lighter... stronger... longer lasting*

IRON AGE

CONTENTS

THE IRON AGE
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DIGEST

DECEMBER TWENTY FIRST • NINETEEN FIFTY • VOLUME 166 • NUMBER 25

INDUCTION HARDENING LOWERS AXLE COSTS

PAGE 69 Improved physical properties and reduced production costs have been obtained through use of plain carbon steel instead of alloy steel in axle shafts. Lower-grade steel use is made possible by the use of induction hardening in place of the heat-treating methods which had been formerly utilized.

METALS RESEARCH REACHES ALL-TIME HIGH

PAGE 74 Armour Research Foundation, Chicago, has grown from a 3-man staff in 1936, to a staff of more than 670 men handling a research volume of over $4½ million. Its metals department employs 71 researchers, currently working on 25 projects at an annual research volume of more than $750,000.

TWO-PIECE PUMP ROTOR SAVES MACHINING

PAGE 78 As a one-piece part, a pump rotor required too much complicated machining. When made in halves, later to be brazed together, the machining is simplified and fewer machining steps are required. Despite the added cost of brazing the halves together after machining overall output cost is less.

DEFENSE OVERSHADOWS PEAK STEEL YEAR

PAGE 15 Almost lost in the shuffle of quickening defense moves is the greatest record of steel ever produced by a single nation in one year. Steel ingot output in the U. S. this year will total about 96,954,186 million net tons; finished steel will amount to about 71,746,098 million net tons.

NEED TACT TO REJECT UNRATED ORDERS

PAGE 33 A gentle touch is needed by the machine tool industry to reject unrated orders they cannot possibly fill. The backlog of unfilled orders runs about 12 times the size of current monthly shipments and the industry found that tact was an important part of business. Backlogs beat World War II's.

INDUSTRY AND LABOR HIT AUTO PRICE FREEZE

PAGE 60 Automobile manufacturers and the UAW-CIO will go along with the freeze on prices ordered by Washington last week but protest "discriminatory" pin-point control. Management feels its price-hikes were moderate. Some feel that the auto industry is being used as a test for all-out controls.

WHY ISN'T THE UNICEL FREIGHT CAR USED?

PAGE 67 NPA asked the Defense Transportation Administration a question pertinent to the steel shortage—why haven't the railroads been urged to order the new Unicel refrigerator boxcar combination? They are said to use 20 tons less steel. Congress will take a look into the 5-year writeoff program.

SHIFTING GEARS FOR QUICK DEFENSE OUTPUT

PAGE 91 Economic controls will start coming thick and fast for a transition from the peace-time economy to swift-paced defense mobilization. On the way are more price-wage controls and materials restrictions. A controlled materials plan is a certainty within a few months—as is the excess profits tax.

RUSSIANS RESUME CHROME ORE DELIVERIES

PAGE 94 Although the Iron Curtain has slammed down on exports of chrome ore to the U. S., Russia has resumed delivery and has sent substantial tonnages in the third quarter this year. The realistic Reds reason that they should also earn dollars since the U. S. can obtain the chrome ore elsewhere.

STEELMAKERS INCREASE CAPACITY IN 1950

PAGE 95 American steelmakers boosted their steelmaking capacity in 1950 by a minimum of 2,145,000 tons. That made total capacity 101,537,800 tons at the year's end, as compared to 99,393,800 tons at the close of 1949. Around 72 pct of the capacity came through improvement of existing facilities.

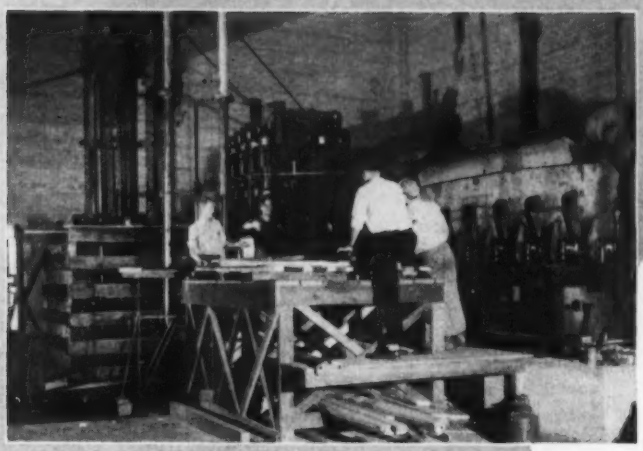
HIGHER RAIL RATES MEAN STEEL COST HIKE

PAGE 97 The 4 pct freight rate increase proposed by 179 roads in the East will add 25¢ to 40¢ to the cost of making a ton of finished steel. This would include the 12¢ per ton rate hike proposed for bituminous and anthracite coal. Steel consumers will pay from 35 to 50¢ to get the steel into plants.

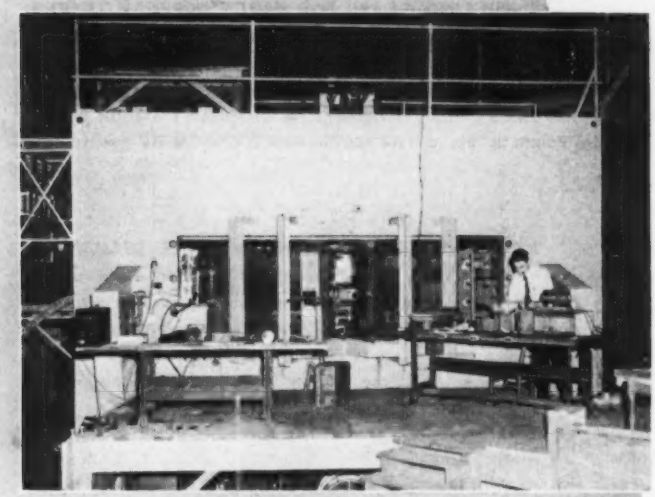
USE OF RUBBER IN METALWORKING INDUSTRY

NEXT WEEK The metalworking industry is spending over $94 million a year for mechanical rubber goods, discloses a survey by THE IRON AGE. Even greater consumption is expected in 1951. All demands should be met by the expanding stockpile of natural rubber and reactivation of wartime synthetic plants

a cincinnati shear helps build the biggest betatron in the world



Cincinnati 10014 Series Special Shear cutting laminations for the Betatron.



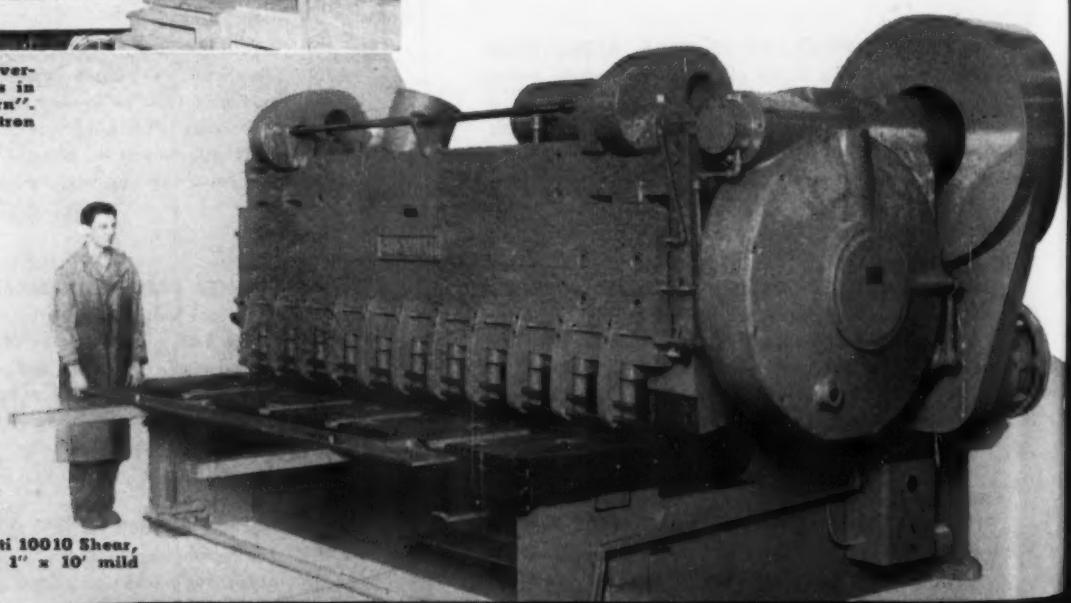
Betatron was built by University of Illinois physicists in sunken "Betatron Barn". Flux magnet of Betatron weighs 275 tons.

University of Illinois builds powerful radiation machine to split atoms.

Betatron produces 300 million volts, speeds up electrons to 186,000 miles per second. First job for this Betatron (world's biggest atom smasher) is the study of the mysterious sub-atomic mesons.

A Cincinnati Shear cut the laminations for this spectacular machine. Other Cincinnati Shears also are widely used by electrical manufacturers for shearing lamination stock accurately and without burrs. Knife life is unusually long on a Cincinnati even on this abrasive material.

Write for Catalog S-5 on Cincinnati All-Steel Shears, the shears of accuracy.



Cincinnati 10010 Shear, capacity 1" x 10' mild steel.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS · SHEARS · BRAKES

CINCINNATI

What Price Human Dignity?

ENGLISH and Western European diplomats call for negotiations, caution and haste slowly in dealing with the Reds. Dean Acheson—whose scalp many Republicans and some Democrats were after—held out for bold action and limited negotiation; and failing that limited harassment of the Red Chinese.

Free people everywhere wait while silk hat and striped pants diplomacy decides their future—by arguing for time, compromise and maybe defeat.

Mr. Baruch long ago called for quick mobilization if we were to remain free. He named Russia as the aggressor. Herbert Hoover long ago listed for public consumption more than 33 double crosses by Russia.

Thomas Dewey for years has boldly named Russia as the aggressor and warned against her ambitions. He called for action at home time and time again.

Charles E. Wilson of General Electric says the real aggressor—Russia—has never been named officially for all to hear or see. Other industrialists feel the same way.

Hanson Baldwin, realistic military editor of *The New York Times* went to Asia to see things for himself. His past warnings and predictions were strengthened by what he saw and heard. More than ever he believes that Red China and Russia know no honor, no integrity and know nothing of human dignity.

The man on the street was startled at our leaders telling us all was at stake and then doing little or nothing about it. More and more people were beginning to think they didn't know what to do. The people welcome an emergency order and real signs of activity. But based on what has gone on before they must be shown.

The people with whom we are asked to negotiate and appease have consistently been getting what they want—at the expense of free nations.

Russia and Red China know how weak we are militarily. A National Emergency Order must be more than a scrap of paper. We have wasted precious time. If the emergency proclamation is to mean anything, we must have real action from Washington.

How much is freedom worth? Living UN casualties know who the enemy is. Will we act and work quickly for a United States that is strong mentally, militarily and morally—before it is too late?

Tom Campbell

editor

Carilloy "T" Steel greatly

ON THE MARION 5561 — WORLD'S LARGEST POWER SHOVEL

THE mammoth 45 cubic yard bucket on Hanna's "Groundhog" is moving more than a million yards of overburden every month. Despite the exceptional punishment it receives, the U·S·S CARILLOY T-Steel lip-plate has already been in service much longer than any steel previously used.

Further, the higher physical properties of T-Steel have made possible design changes which are now under way and which should greatly extend lip life beyond present construction.

Here's what Hanna Coal Company says, as owner and operator, "The lip of this bucket (made from 4½" CARILLOY T-Steel) is one of the most critical sections and it takes a great deal of punishment when loading the rock strata we have at this location. At Marion Power Shovel Co., we have a *50-yard* bucket on order. It will be built almost entirely of T-Steel . . ."

In this new bucket, CARILLOY T-Steel will increase capacity 5 yards — almost *9 tons* — by cutting weight without any sacrifice in strength. And because it can be welded *in the field*, T-Steel construction makes it unnecessary to shut the shovel down for the many hours formerly required for shop repairs.

CARILLOY T-Steel, a product of United States Steel research, is a *low carbon* alloy steel, heat-treated with great precision. Minimum yield strength is 100,000 psi (for plates ¼" to 2" inc.) Furthermore, T-Steel will remain ductile at arctic temperatures—*even after welding.*

Welding does not lower the strength of the plate. If AWS electrodes E-12015 or E-12016 are used, welds remain 100% strong . . . both butt and fillet-welded specimens will break completely outside of the heat-affected area. As for toughness, laboratory tests have proved that, even after gas-cutting, T-Steel can be bent at more than 100°F. below zero.

CARILLOY T-Steel is normally produced in the forms of plates and bars. Nominal hardness is 250 Brinell, although 321 minimum Brinell can be furnished for abrasive conditions where a combination of high hardness, toughness and weldability is essential.

IRON AGE *newsfront*

news methods and product forecast

► Availability of high grade steelmaking scrap may be the determining factor in plans to proceed with five proposed increases in electric furnace capacity. Some observers feel that the shortage of high grade scrap is the steel industry's most serious problem. As a result, a lot of attention is being given to direct reduction of iron ore as a charge for the electric furnace.

► Many automobile companies are inclined to take the necessary change from aluminum to cast iron pistons pretty much in stride. Few customers will be able to tell the difference, they say. At least one big producer will change over with its new models to be introduced in January.

► The proposed 4 pct increase in freight rates by Eastern railroads would add between 25¢ and 40¢ to the cost of producing a ton of finished steel. Steel users would find their costs 35¢ to 50¢ a ton higher. The roads are asking that the increase be made effective Jan. 1. However, some traffic men doubt that it could be applied before March.

► Look for business men on government payrolls to begin taking a more active role instead of the advisory part most have had to play so far. Formally or informally, industrialists will have more authority to get things going.

► An allocation program may soon be forthcoming to cover rails and track supplies.

► In the steel plant expansions of recent months, some progress on various types of steel needed to build new facilties has been made by trading back and forth between steel companies. Some day there may be quite a stink because Washington has made no move to give makers of plant equipment a green light on supplies; and lead time usually runs to a year or more between placement of equipment orders and operation of the machinery.

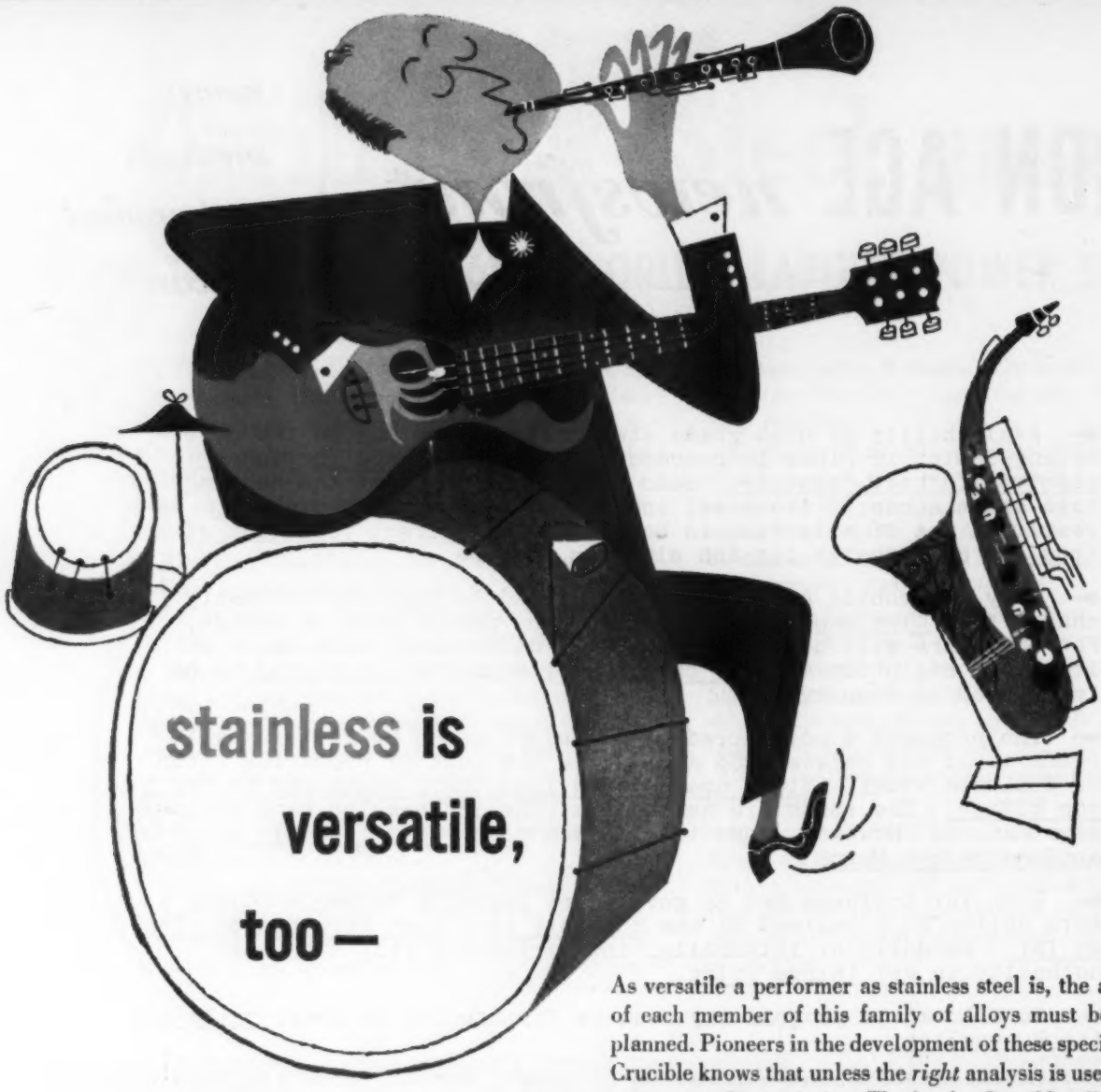
► At least one large refrigerator manufacturer plans to substitute aluminum for the stainless steel now being used in evaporators. The company figures that when aluminum gets as tight as stainless is now it will be almost entirely off civilian production anyway.

► Because Washington is not at all satisfied with the size of strategic stockpiles, government competition for critical materials will increase within the next few months.

► Steel warehousemen are worried about first quarter 1951 shipments, with one usually well informed source predicting a 35 pct cut under fourth quarter 1950 shipments.

► Stiff restrictions on materials will send automakers scrambling for substitutes. Copper substitutes will be hardest to find. Best possibilities for reducing copper requirements include use of thinner-walled tubing, changes in top and bottom radiator tanks and elimination of car heaters.

► An experimental project to develop a commercially practical method of producing electrolytic manganese dioxide from ores in the Northwest is under way.



As versatile a performer as stainless steel is, the application of each member of this family of alloys must be carefully planned. Pioneers in the development of these specialty steels, Crucible knows that unless the *right* analysis is used, stainless may prove disappointing. That's why Crucible offers you the services of an alert staff of metallurgists and engineers to help you apply stainless . . . properly. These engineers and metallurgists have all the wealth of experience that Crucible's half century of specialty steel leadership provides . . . take full advantage of it.

Whatever your stainless application may be, Crucible is prepared to help you. Whether the order is in pounds or tons, Crucible tackles every industry-posed problem with a keen devotion to detail. If you're thinking of stainless . . . call in Crucible. CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

CRUCIBLE first name in special purpose steels

STAINLESS STEELS

fifty years of Fine *steelmaking*

STAINLESS • HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

IRON AGE *summary*

iron and steel industry trends

flat-rolled quotas cut 50 pct
expect faster defense orders
steel output tops all records

THIS week steel consumers are being informed of drastic cutbacks in their February allotments of steel. The cutbacks vary widely for different products and different companies. Deepest slashes are in quotas for flat-rolled products such as plates, sheets and strip. Compared with allotments of last October, February quotas on these vital products are expected to be reduced about 50 pct.

As previously predicted plate quotas are being hit hardest of all. Several companies are already planning to curtail plate allotments for February by as much as 60 pct. If the petroleum industry is allowed even a substantial part of the 11.9 million tons of steel they are asking, plate consumers will be hit even harder.

Switch to Plate Production

In order to fill the plate requirements of such a program many mills now producing sheet and strip would have to switch to plate production. This, of course, would cause deeper cutbacks in sheet and strip. Plate producers who fabricate part of their output would have to make more of their plate available to the program, or fabricate more of it into program products.

Some oil companies, hard hit for supplies, are salvaging old equipment that ordinarily would go into the scrap pile and are putting it into new installations.

So far missing from the programs assured steel priority is the steel expansion program. Most steel firms have been holding out the tonnage needed for their own expansion if they can make it. This further reduces consumer allotments of (free) steel. As more and more projects are programmed and the industry moves closer to a controlled materials plan special provision will have to be made for steel needed to expand the steel industry.

Defense orders which had been picking up slowly are expected to increase by leaps and bounds soon after the first of the year. The national emergency declaration makes it possible to negotiate government contracts, thus bypassing the time-consuming policy of letting contracts on the basis of bids. Procurement agencies can now negotiate quickly and directly.

Firms Eager to Substitute

Cancellation of a few conversion deals during the past week has not established a trend; rather it reflects some hesitation on the part of certain buyers. For every deal cancelled there are many companies eager to sign up for this high priced steel. Major converters are booked full as far as they care to be.

The few conversion cancellations noted so far resulted from two things: (1) Government orders restricting use of other strategic metals is causing some firms to slow up on steel conversion. deals. (2) Some consumers over-extended themselves by trying to make conversion arrangements with anyone who would listen to them. Cancellations are still the exceptions. The pattern among consumers is to take all the steel they can get from any source—even if they believe they will have to cut back operations.

Almost lost in the shuffle of defense mobilization is the amazing production record of the steel industry. The final figures will show the steel industry will have produced about 96,954,-186 million net tons of ingots and steel for castings. When converted into finished steel products this will amount to about 71,746,098 tons.

To Hit 100 Million Mark

Ingot production will be about 7 million tons greater than any previous year, including war years. When steel people finally realized their dream of a 90-million-ton-year, they did it in a big way. They are now within striking distance of 100 million tons of steel output for next year.

Steelmaking operations this week are scheduled at 101 pct of rated capacity up one point from last week's revised rate.

(nonferrous summary, p. 116)

Mr. Parks had a tubing problem . . .

so he called in the ELECTRUNITE Metallurgist . . .

and in practically no time at all . . .

Mr. Parks manufactures school desks. Very good desks, too . . . but, even so, Mr. Parks is always looking for ways to make them better.

This is the way Mr. Parks' problem came about . . . 1½" x 11 gauge tubing is bent U shape to form a support for both seat and table of Mr. Parks' desks. Design calls for a short radius bend, and he was using a fully normalized tube that Rockwell "B" tested under 55.

"Not stiff enough", decided Mr. Parks. "No desk of mine is going to sag when a heavyweight leans against it! On the other hand, the tube must not be so hard it breaks in bending." What to do? — one thing, of course, and Mr. Parks did it. He called in the ELECTRUNITE Tubing Metallurgist. As a result of this call, processing changes were made resulting in a stiffer tube with a higher yield point and a higher Rockwell reading. These tubes readily take the short radius bend and still give Mr. Parks' desks the extra sturdiness and strength he wanted them to have.

Mr. Parks isn't his real name, of course, but his problem was real. When you have a tubing problem, why not do as Mr. Parks did? Call for a Republic ELECTRUNITE Tubing Metallurgist. There is no charge for his services and no obligation on your part for his help. Just let us know when you would like to see him—and he'll be there.

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic
REPUBLIC STEEL
ELECTRUNITE TUBING

Dear EDITOR

letters from readers

What's Considered Excessive?

Sir:

We at Esterline-Angus certainly enjoyed your editorial in the Nov. 30 issue entitled "Who's Fooling Who?" Despite the soundness of the views expressed in your editorial, views which are appreciated and concurred in by any businessmen who have given the subject serious thought, it looks as if the Administration supporters will ram through an Excess Profits Tax anyway, despite its complication, inefficiency, discriminatory nature and false label.

I recently wrote to our senators from Indiana, and also to Senator Walter F. George, Chairman of the Senate Finance Committee, regarding this tax. By the way, this letter to Senator George was written before I had read your editorial, but I made the same point regarding the unfairness of labeling profits as "excessive," as if they were something improper, even indecent.

My colleagues here felt that in writing to our Senators I was wasting my time, but how are our lawmakers going to know what individual businesses think, particularly those smaller unorganized businesses, unless we take the trouble to tell them.

R. J. KRYTER
Treasurer

Esterline-Angus Co., Inc.
Indianapolis

That's The Problem!

Sir:

We read in your magazine that the price for billets is $53.00 per ton. Will you kindly advise us where we can obtain some of this material.

L. SPIRA
President

Industries Trading Corp.
New York

We can't be much help on a possible source of supply. Thousands of people are seeking the same thing—more steel.—Ed.

New Gaging Method Info

Sir:

On p. 83 of the Nov. 23 issue you reported on a new gaging method which apparently has been instrumental in increasing production of air frames and other such components. I appreciate that this method and whatever instruments are involved are probably closely tied up with the defense program and, therefore, the details may not be readily available for wide distribution.

I am wondering, however, if you could supply more information on this subject so that a better evaluation of its applicability to our work might be had. We are interested in lining up bearings for large machinery. We are also interested in building fixtures for welding operations. During the last war we fabricated component parts for air frames and, therefore, we have a prime interest in this instrument if we should get into the manufacture of such components again.

J. MANUELE
Director, Headquarters Quality Control

Westinghouse Electric Corp.
Pittsburgh

This development is not a closely guarded secret; on the contrary, the Air Force welcomes distribution of information and encourages wide use of the optical method of aligning fixtures. A more detailed description appeared in an article entitled "Optical Tooling—Faster, More Accurate," on p. 119 of the Dec. 7 issue. Further information might be obtained from Adolf Kastelowitz, Chief of Mfg. Research, Republic Aircraft Corp., Farmingdale, L. I., N. Y.—Ed.

All Specially Built

Sir:

We are interested in obtaining a source of supply of a machine for the manufacture of a fine grade of steel wool and would appreciate your advising us of the name and address of a manufacturer of such machines.

W. A. MORGAN

Frazar & Hansen Ltd.
San Francisco

Having received a number of export inquiries from time to time on machinery for the manufacture of steel wool, we made several extensive searches. So far we have been unable to locate any manufacturer of standard equipment for this product. Steel wool manufacture in the United States is in the hands of about half a dozen firms. In each case, we have been advised, the equipment is of special design. A number of years ago equipment of German manufacture was imported into this country, and apparently this has served as the basic design, with modifications being made by the individual manufacturer.—Ed.

Painting Automobiles

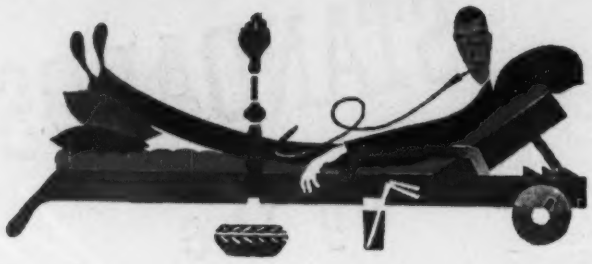
Sir:

In the Oct. 12 issue of your publication, p. 186, we noted with interest the item on a new paint finishing method for automobiles. We are interested in obtaining more detailed information on this method and would appreciate your forwarding the name of the company using it in order that we may contact them.

A. J. LIEBMAN
Research Engineer

Dravo Corp.
Pittsburgh

The news item mentioned concerns a report by C. L. McCuen, Gen. Mgr., General Motors Research Laboratory, Detroit. It is our understanding that the process is being used by General Motors; in order to secure further information, write directly to Mr. McCuen, c/o General Motors Research Laboratories, P. O. Box 188, North End Station, Detroit 2.—Ed.



fatigue cracks

by charles t. post

Tuned In

Since your favorite family journal was swaddled as a tabloid newspaper back in 1855, its outer dress has varied widely. Its name has been written on the front cover banner in everything from stiff Roman type to imitation iron bars bent to form the letters, depending on the temper of the times. No doubt the next hundred years will see as many more changes, but our guess is that the new insignia you see for the first time this week will be in vogue for quite a stretch.

It is the conception of William Metzig, an almost fabulous New Yorker, who makes his living exclusively by designing trademarks and lettered insignia. A large share of the trademarks you associate with nationally advertised firms and products are Metzig's creations, for each of which he extracts a fee roughly in line with a vice-president's salary. A trademark of distinction, you understand, is no matter of whimsy. Its creator must combine the genius of an artist, an engineer, an advertising man, and an attorney—and such a blend of genius, properly aged, comes high. If you could have seen him balancing your f.f.j.'s front cover elements on a jeweler's scale and spacing them with a micrometer, you would get the idea immediately.

Once Metzig had created the new front cover design, Editor Tom Campbell was as fretful as your wife when she's just bought a new dress and discovers that her old purse, shoes, hat, and hairdo simply "won't do" for another minute. Tom lost no time in calling in typographical couteriers to revamp the index page and all major department headings. The new style headings, he assures us, complement exactly the clean-cut, vital items you read below them without being distracting. They are pitched exactly to your taste, setting up some sort of a magnetic attraction, according to electronic theory, which compels you to read the entire page.

Only Fatigue Cracks appears under the same shrub as before. The author's likeness, Campbell says, could not be improved by camera. Here, as always, you can relax a minute, and find abundant information which will not help you become more intelligent nor do a better job. Only place in the book like it.

Puzzlers

We feel impelled to report a disturbing trend indicating that not all readers of this corner are lovers of pure mathematics. First, S. B. Knutson of National Electric Products sent us "the oil drained from the oil drum"—a piece of bar stock carefully machined exactly to shape. Obviously he had computed his answer by measuring the remainder of the piece, and, incidentally, was remarkably close. Now, Byron Mitchell of Smith & Wesson reports the volume of material removed by three-way drilling a cube as "0.953125 oz." What kind of metal?

Lieut. Col. W. S. Hancock of the Royal Fusiliers, chief inspector of armaments in Pakistan, apologizes for being late with his answer (correct) to the diagonal plank problem, but says your f.f.j. takes about 6 weeks to reach him.

Also correct, but closer home: John M. Sherman, Hobart Mfg. Co., on the oil drum and drilled cube; Walter Schroeder, Cincinnati Milling Machine Co., and B. F. Van Horn, Union Forging Co., on the oil drum; Robert Huff, Canton, on the tire dealer and hole in cube; Eugene L. Greth, Birdsboro Steel Foundry & Machine Co., Benjamin L. Obear, Fayscott Corp., C. I. Gardner, Orinoco Mining Co., and Harry F. Orr, Tampa Hardware, on the egg dealer.

John E. Toth, Babcock & Wilcox, poses this one for the holidays: A 48 ft long wire cable starts at a point on the side of a building and goes around a cylindrical smoke stack and back to the same point on the building. If the distance from this point on the building to the nearest point on the stack is 20 ft, what is the diameter of the stack?

machine tool high spots

sales inquiries and production

by w. a. lloyd

Diplomacy Needed — With a backlog of unfilled orders approximately 12 times the size of current monthly shipments, what some machine tool companies were looking for this week was a nice, diplomatic way of turning down unrated orders.

One company's deliveries are extended to the point where it was forced to refuse an invitation to bid on 40 machines because it could not produce them in the time required.

In World War II, backlogs were never greater than seven times the then current monthly shipments.

Clear the Smoke Away—Declaration of a national emergency, now or later, is expected to result in a general clearing of the industrial atmosphere and possibly reduce the time lag in arms delivery by about one-third, according to some estimates. This is probably optimism of the rankest sort, but some of the military planners are giving it lip service.

Thus far there has been no official word on priorities for materials for the machine tool industry. Any speed-up in arms delivery will depend on increased shipments of machine tools sooner or later.

Wilson's Good News—Appointment of Charles E. Wilson, president of General Electric Co., to the post of defense production chief will be happily received by the machine tool industry. Mr. Wilson is an industrialist of great ability and an administrator in whom the machine tool industry will have every confidence.

Two other appointments were announced this week. Herbert L. Tigges, executive vice-president, Baker Bros., Inc., Toledo, was named consultant to NPA on machine tools, and Marshall M. Smith, executive vice-president, E. W. Bliss Co., has been appointed head of the Machinery Div. of NPA.

Orders Dip, Output Up — According to a preliminary report, new orders for machine tools in November declined fractionally from the October level, but shipments increased to about $33,000,000, an improvement.

In Washington, American business plans to invest $4.8 billion in new plants, machinery and other equipment during the first quarter of 1951, setting a new high for first quarter expenditures, according to a report made jointly by the Dept. of Commerce and the SEC.

"On the basis of preliminary returns, if plans for the year as a whole are realized, 1951 capital outlays will be higher than in any previous year," the report stated.

At Least Equal—According to present estimates, total outlays for 1950 will just about equal the 1949 total of $18.1 billion. Outlays in the first half of 1950 were about 12 pct under the 1949 first half total. Expenditures during the last half of 1950 are expected to amount to $10.1 billion, a 12 pct increase over the last half of 1949 and about equal to the record amount spent in the last half of 1948.

Almost the entire business expenditure increase in the last half of 1950 over the corresponding period of 1949 was accounted for by manufacturing corporations. In the last half of 1950 manufacturing companies will have invested about $4.6 billion in plant and equipment compared with $3.5 billion in the last half of 1949.

New Euclid Plant—In Cleveland, Reliance Electric & Engineering Co., a large supplier of motors and drives to the machine tool industry, will start construction immediately on a new $1,500,000 plant in suburban Euclid, Ohio.

J. W. Corey, Reliance President, said his firm has acquired a 60-acre site for the new plant, which will be a one-story structure containing 130,000 sq ft of floor space.

DATES *to remember*

Jan. 6—American Home Laundry Manufacturers Assn., winter meeting, Hotel Morrison, Chicago. Association headquarters are at 38 S. Dearborn St., Chicago.

Jan. 8-12—Society of Automotive Engineers, annual meeting, Hotel Book-Cadillac, Detroit. Society headquarters are at 29 W. 39th St., New York.

Jan. 9—Mining & Metallurgical Society of America, annual meeting, Mining Club, New York. Society headquarters are at 11 Broadway, New York.

Jan. 10-12—Heat Exchange Institute, annual meeting, Seaview Country Club, Absecon, N. J. Institute headquarters are at 122 E. 42nd St., New York.

Jan. 14-16—Institute of Scrap Iron & Steel, annual convention, Commodore Hotel, New York. Institute headquarters are at 1346 Connecticut Ave., N.W., Washington.

Jan. 15-16—Industrial Furnace Manufacturers Assn., mid-winter meeting, Edgewater Beach Hotel, Chicago. Association headquarters are at 420 Lexington Ave., New York.

Jan. 15-18—Plant Maintenance Show, Public Auditorium, Cleveland. Exposition management Clapp & Poliak, Inc., 341 Madison Ave., New York.

Jan. 16—American Boiler Manufacturers Assn. & Affiliated Industries, mid-winter meeting, Cleveland. Association headquarters are at 264 Rockefeller Bldg., Cleveland.

Jan. 18-20—Society of Plastics Engineers, annual national technical conference, **Statler Hotel, New York.** Society president is J. H. Dubois, 160 Colt St., Irvington, N. J.

Jan. 19—Malleable Founders Society, semiannual meeting, Hotel Cleveland, Cleveland. Society headquarters are at 1800 Union Commerce Bldg., Cleveland.

Jan. 21-23—Truck Trailer Manufacturers Assn., annual convention, Edgewater Gulf Hotel, Edgewater Park, Miss. Association headquarters are in the National Press Bldg., Washington.

Jan. 22-23—Compressed Gas Assn., annual convention, Waldorf Astoria Hotel, New York. Association headquarters are at 11 W. 42nd St., New York.

Jan. 24-25—Caster & Floor Truck Manufacturers Assn., winter meeting, Hotel New Yorker, New York. Association headquarters are at 7 W. Madison St., Chicago.

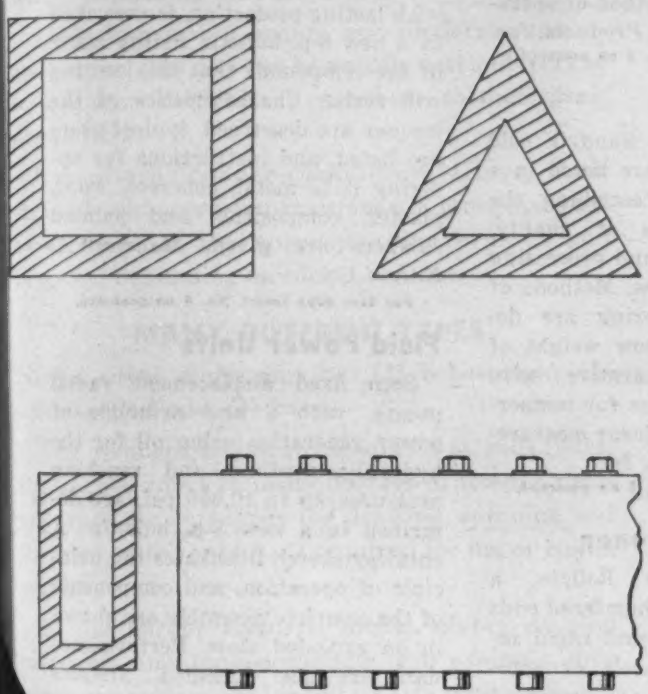
Jan. 28-Feb. 1—Associated Equipment Distributors, annual meeting, Stevens Hotel, Chicago. Association headquarters are at 360 N. Michigan Ave., Chicago.

Feb. 19-22—American Institute of Mining & Metallurgical Engineers, annual meeting, Jefferson Hotel, St. Louis. Institute headquarters are at 29 W. 39th St., New York.

Mar. 5-7—Hydraulic Institute, quarterly meeting, Santa Barbara Biltmore Hotel, Santa Barbara, Calif. Institute headquarters are at 122 E. 42nd St., New York.

Mar. 5-7—Manufacturers Standardization Society of the Valve and Fittings Industry, annual meeting, Commodore Hotel, New York. Society headquarters are at 420 Lexington Ave., New York.

BASIC SHEAR DESIGN Results in Accurate Cutting



● BED, CROSSHEAD, HOLDDOWN and HOUSINGS in NIAGARA UNDERDRIVE SHEARS are box sections to resist with minimum deflection the horizontal, vertical, diagonal or torsional stresses to which every shear is subjected. No other section will do the job as efficiently. This construction results in extreme strength and rigidity without resorting to deep beam sections which, in the bed, necessarily project below the floor line.

The simple, mechanically operated holddown having individual self compensating pressure feet, performs all required functions of a good holddown efficiently, effectively and quietly without using complex hydraulic circuits, pumps, valves, packings, cylinders, etc. and without generating heat. Maintenance costs are held to a minimum.

The drive is thru efficient spur gears mounted on anti-friction bearings and running in oil. It employs the famous Niagara 14 point instant engaging sleeve clutch. There are no sliding surfaces such as in worm gears and friction clutches to consume power, generate heat, and to wear rapidly.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

Manufacturers of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK

FREE *publications*

These publications describe money - saving equipment and services . . . they are free with no obligation . . . fill in and mail postcard.

Spray Valve

The Farval spray valve, for accurately controlled spraying of lubricants onto open gearing, slide surfaces and other open bearing areas, is described in a new 4-p. bulletin. Details of operation are shown in a series of cross-sectional drawings, illustrating how adequate lubrication of open bearing surfaces is accomplished by this simple, inexpensive system for spraying grease and oil. *Farval Corp.*

For free copy insert No. 1 on postcard.

Production Machinery

The Williams-White line of hydraulic presses for drawing and forming, hydraulic presses for straightening, universal tube benders, mechanical and hydraulic bulldozers, punching machines, crank presses, shearing and rolling machines, hot plate presses and plastic molding presses are shown in a new 8-p. bulletin describing general features of the various models. *Williams-White & Co.*

For free copy insert No. 2 on postcard.

Lifting Magnets

Capacities, ratings and dimensions of Dings welded lifting magnets are detailed in a new 6-p. catalog. Cross-section of the improved magnet is shown and a number of new features are described in the folder. The Allen-Bradley control unit is also illustrated, and photos show the magnet in action. *Dings Magnetic Separator Co.*

For free copy insert No. 3 on postcard.

Paint Heaters

Spraying finishes at controlled temperatures can result in pronounced paint and thinner savings, higher quality finishes, faster production and fewer rejects, as shown in a new 8-p. folder describing Bede paint heaters. Models of the heater to suit all types of installations are described, and the method of operation is detailed. *Bede Products, Inc.*

For free copy insert No. 4 on postcard.

Spring Steels

Available sizes of Sandvik cold rolled spring steels are listed in a new 32-p. catalog describing the company's standards of quality, raw materials used, and processing methods and facilities. Methods of specifying and ordering are detailed, and tables show weight of spring steel, comparative wire gages, and conversions for temperature, hardness and linear measurement. *Sandvik Steel, Inc.*

For free copy insert No. 5 on postcard.

All-Purpose Fastener

Features of the Rollpin, a pressed-fit pin with chamfered ends that permits simple and rapid insertion with hand tools or automatic jig assemblies, are presented in a new 4-p. folder. Compressed as it is driven into place, the pin exerts constant pressure against the hole walls, keeping it permanently in place until deliberately removed, as shown in the bulletin. Typical applications are illustrated and sizes are listed. *Elastic Stop Nut Corp. of America.*

For free copy insert No. 6 on postcard.

Industrial Gloves

Jomac regular work gloves and heat-resistant, flame-resistant gloves are described in a new 4-p. folder telling how, in many cases, these gloves will outwear seven pairs of ordinary gloves. Other items shown in the bulletin include hand pads and guards, and safety gauntlet cuffs. *C. Walker Jones Co.*

Fore free copy insert No. 7 on postcard.

Acid and Alkali Proof

Pyroflex lacquer, combining ease of application and maintenance with lasting protection, is described in a new 8-p. bulletin listing many of the compounds that this coating will resist. Characteristics of the lacquer are described, typical users are listed, and instructions for applying it to metal, concrete, wood, plaster, composition and painted surfaces are given. *Maurice A. Knight Co.*

For free copy insert No. 8 on postcard.

Fluid Power Units

Seco fixed displacement radial pumps, with a new principle of power generation using oil for the hydraulic medium and reaching pressures up to 10,000 psi, are described in a new 8-p. bulletin. A cutaway sketch illustrates the principle of operation, and components of the complete assembly are shown in an exploded view. Performance data are also included. *Simplex Engineering Co.*

For free copy insert No. 9 on postcard.

Controls Counts

What the Streeter-Amet predetermining counter does and how it works is the subject of a new 4-p. bulletin listing a few typical applications. Also described is the complete line of scientific and industrial recording counters, built primarily to gather counting or industrial data, and offering unlimited applications. *Streeter-Amet Co.*

For free copy insert No. 10 on postcard.

Wire Bender

The H & D automatic wire bender, designed for production and featuring continuous stroke performance, is described in a new 8-p. bulletin. Specifications and con-

Turn to Page 106

Why NICKEL SILVERS

constantly increase in popularity

NICKEL SILVERS are a group of lustrous copper-base alloys whose colors range from light pink to silvery white, depending on composition.

Their impressive beauty and moderate cost... and the fact that they can be readily cast and worked by ordinary methods... contribute to their great popularity.

Essentially copper-nickel-zinc alloys, their strength and corrosion-resistance in most cases exceed those of the corresponding brasses and bronzes, depending on nickel content.

MANY DIFFERENT TYPES

Nickel silver alloys may be: (1) hot-worked, (2) cold-worked and (3) cast.

The wrought forms are available as rods, wire, sheets, and tubes in many degrees of temper ranging from the *soft* types for drawing, spinning and forming, to the *very hard* required for flat or coiled springs.

In the harder tempers, nickel silvers develop relatively high tensile strength. For example, they reach approximately 145,000 p.s.i. in spring wire... obviously, an excellent material for small parts subject to considerable stress. Moreover, wrought nickel silvers are furnished in various ranges of grain size, from "fine" for polishing and etching, to "large" for forging and coining. Die cast and extruded shapes are also available.

ECONOMICAL TO FABRICATE

Nickel silvers promote economy and speed in fabricating all sorts of products. Applications include tableware, hollow ware, springs, keys, slide fasteners, weather stripping and parts for radios, television, telephones, typewriters, musical instruments, cameras, optical goods, fishing tackle and thousands of other articles.

CAST NICKEL SILVERS may be matched in color with the wrought forms. They are also complementary to chromium-nickel stainless steels and Monel®.

Nickel silver castings containing 20 per cent nickel are silvery white all the way through and exhibit the following properties:

Tensile Strength (cast)	40-60,000 p.s.i.
Yield Point (.5% ext.)	20-32,000 p.s.i.
Elongation in 2"	15-25%
Reduction of Area	15-30%
Coefficient of Expansion	0,0000091 per degree F.
Specific Gravity	8.70-8.90
Weight per cubic foot	540-550 lbs.
Brinell Hardness	75-100 (1000 kg. load)
Shrinkage (inches per foot)	3/16
Machinability	Readily machined by all methods

The cast forms are widely used by architects, decorators and builders, and extensively in hardware, packaging machinery, bottling machinery, dairy equipment and plumbing goods. Centrifugally cast cylinders and leaded bearings are also available.

COUNSEL AND DATA

Nickel silvers, wrought or cast, offer opportunities to increase product acceptance... and at the same time... to improve quality and cut costs.

The many standard grades of nickel silvers permit selecting one with the best set of properties for any reasonable fabrication and service demands. We shall be glad to furnish you with counsel and data on these versatile alloys.

EMBLEM OF INCO SERVICE

Because of unusually heavy industrial and defense demand, rationing of nickel has been in force since July 1st. However, we believe that dissemination of technical data and service experience can help to promote the intelligent utilization of critical materials, so essential in these times. We shall, therefore, continue to issue information on new developments and user experience with nickel-containing materials.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

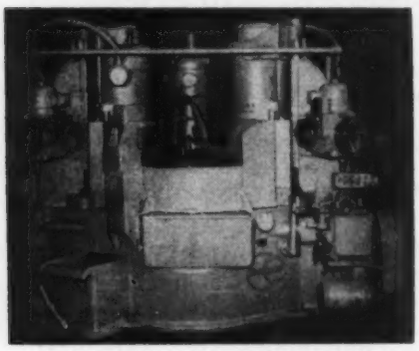
user to line-out, without incurring undue overshoot. The ability to operate with a very narrow proportional band eliminates set point shift with varied load changes. Two models are available. *Automatic Temperature Control Co., Inc.*

For more data insert No. 26 on postcard, p. 39.

Surface Grinder

Vertical spindle, with 40-in. diam magnetic chuck or a plain table.

The grinder is equipped with three abrasive wheels that can be set to grind the same surfaces when stock removal is heavy, or when very accurate tolerances for dimension or surface finish are required. One spindle can be set to grind a surface at the same or different height at a different distance from center of chuck. Grinding wheels are controlled by the Blanchard automatic caliper, or sizing device, said to hold dimension variation within a total range of 0.001 in. *Blanchard Machine Co.*

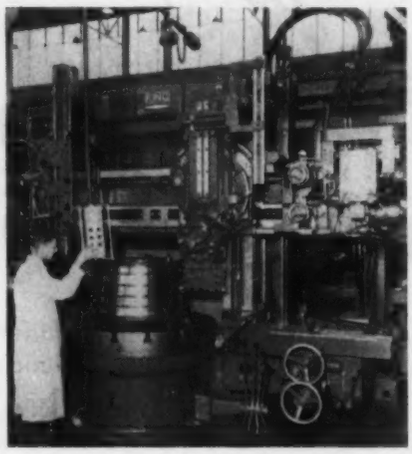


For more data insert No. 27 on postcard, p. 39.

Boring Mill

With contouring attachment speeds jet engine production.

A vertical boring and turning machine with hydraulically controlled tracer attachment is equipped with swivel turret head and special 4-way tool block on the left-hand ram head. In one machine automatic depth contouring and manual roughing with automatic depth control are combined. By shifting one lever, the contouring attachment can be disconnected and the machine used as a standard vertical boring mill. On-the-spot precision adjustments in boring mill operations are made quickly and easily from the operator's normal working position. The machine is available in 10 sizes, ranging from 30 to 144 in. The machine illustrated is a 52-in. model designed for rapid production in a plant manufacturing jet engines. *American Steel Foundries, King Machine Tool Div.*

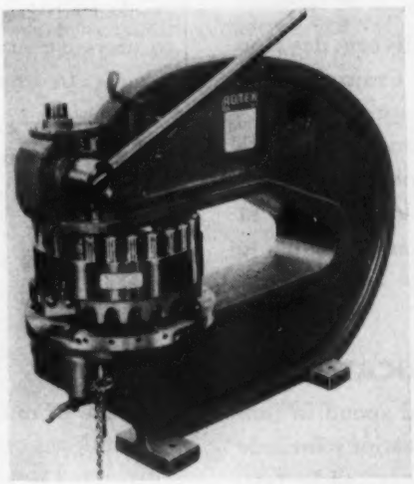


For more data insert No. 28 on postcard, p. 39.

Punch Press

Handles 48-in. wide sheet material. Rotary turret has 18 punch sizes.

The 24-in. throat Model 18B punch press is designed to handle sheet material up to 48 in. wide. The rotary turret permits the operator to locate any one of 18 punch sizes almost instantly. The turret rotates to the wanted punch size, locks in position automatically.



Eighteen punch stations can be furnished on the turret in 5/64 to 2 in. sizes, operating efficiently on cardboard, fiberboard, plastic or sheet iron up to 10 gage thickness. No manual adjustments are necessary, since dies and punches are pre-aligned. *Rotex Punch Co.*

For more data insert No. 29 on postcard, p. 39.

Hammer Drill

Electromagnetic, for high speed hole drilling in concrete and brick.

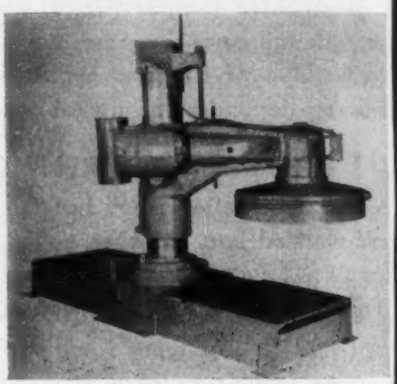
Automatic rotation of the carbide-tipped spiral drill speeds up hole drilling, eliminates manual turning of the drill chuck and reduces fatigue. The automatic rotation of the drill bit is accomplished by a rubber ratchet mechanism actuated by the recoil of each blow of the hammer's piston (3600 blows per min). One-handed drilling is possible because of the tool's light weight. *Syntron Co.*

For more data insert No. 30 on postcard, p. 39.

Core Grinders

Adjustable to accommodate intricate cores; vibrationless performance.

Dual-type core grinders have column, grinding wheel and drive shaft mounted on large dustproof, precision ball bearings to assure smooth vibrationless grinding at all times. Employing a 42-in. grinding wheel with a 38-in. effective cutting diam, grinders can handle intricate or cumbersome cores. Adjustable wheel arm swings progressively around a complete 360° arc. Wheel height above the table ranges from 15 to 42 in. Powered by a 5 hp 900 rpm motor, the grinding wheel operates at 242 rpm. *Milwaukee Foundry Equipment Div., Spo, Inc.*



For more data insert No. 31 on postcard, p. 39.

Die Making Machine

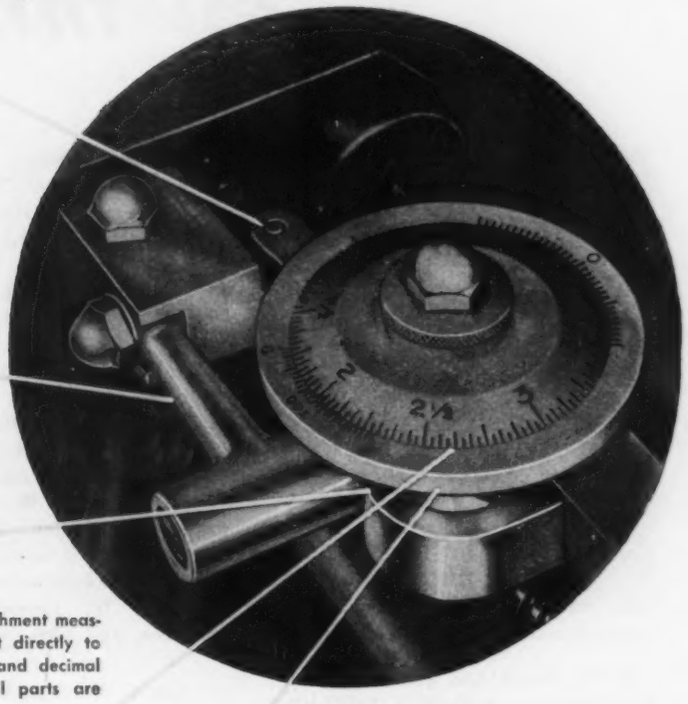
New model contains features for ease and speed in operating.

The new Model F-3 Williams punch and die making machine used for final finishing operations on metal stamping or power press punches and dies and dies for extrusion metals has streamlined construction using an axial air gap

Turn to Page 108

FORGINGS vs. CASTINGS?

Sorry, it wasn't even a contest!



The Weldon Lathe Attachment measures carriage movement directly to .001". Both fractional and decimal dials are available. All parts are chromium plated.

Anaconda Die Pressed Forgings illustrated are full-size and unretouched. On the spindle housing, right, machining costs were reduced 70%; on the dial, next above, 40%.

In the first place, they shouldn't be in the same ring together, because Anaconda Die Pressed Brass Forgings have almost twice the strength of ordinary brass sand castings.

The Weldon Tool Co. of Cleveland, makers of the Weldon Direct Reading Measuring Attachment for lathes, switched from sand castings to forgings and found the extra strength a big sales advantage.

They also found a lot of other things: Solid, dense-grained, readily machinable metal; die-like dimensional accuracy; a surface smoothness that cut finishing and plating costs to the bone. And . . . an overall saving of 30%!

Publication B-9 will get you off to a good start. Write for it now. Address The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: New Toronto, Ontario.

You can depend on twice-wrought

ANACONDA

DIE PRESSED FORGINGS

IRON AGE *introduces*

Leonard L. Robb was appointed assistant to the president and board chairman of STEWART-WARNER CORP., Chicago. Mr. Robb joined the company in 1928.

Edward N. Evans, appointed vice-president and general manager of the CAMBRIDGE WIRE CLOTH CO., Cambridge, Md. Mr. Evans joined the company in 1937 and was formerly secretary and treasurer. **Nina E. Pink** was named secretary and treasurer.

Clayton R. Burt retired from the presidency of POTTER & JOHNSTON CO., Pawtucket, R. I. **Edward P. Gillane** was elected vice-president and general manager of the company.

S. W. Rolph has become president and director of E S B INTERNATIONAL CORP., New York. **J. B. Clark** was named vice-president and director; **J. E. Sheridan,** vice-president and director; **E. J. Dwyer** secretary and director; **E. S. Maiden,** assistant secretary-treasurer-comptroller; **C. E. Murray,** director; **C. F. Norberg,** director; **D. N. Smith,** comptroller; and **E. W. Williams,** treasurer.

P. W. Pheneger, succeeds the late J. W. Schultz, as director of purchasing for SUPERIOR STEEL CORP.

John C. McGunnigal, appointed sales manager of the Steel Strapping Div. of the STANLEY WORKS, New Britain, Conn. He was formerly general sales manager of Brainard Steel Co.

P. F. McEvoy has joined INDUSTRIAL PROCESS ENGINEERS, Newark, N. J., as vice-president.

J. J. Carlson, formerly assistant general sales manager, has been appointed general sales manager of KAISER STEEL CORP., Oakland, Calif.

George Romney, vice-president of Nash-Kelvinator Corp., Detroit, has been named a director of KELVINATOR OF CANADA, LTD., Ontario.

Marvin W. Smith, named president of BALDWIN-LIMA-CORP., Cincinnati, with **George A. Rentschler,** chairman of the board. Other officers: **Walter A. Rentschler,** vice-president in charge of Lima-Hamilton Division; **A. A. Byerlein, H. F. Barnhard** and **C. T. Ziegler,** vice-presidents Lima-Hamilton Div.; **W. R. Parshall,** general comptroller; **Perry A. White,** comptroller, Lima-Hamilton Div.; **J. R. Connaughton** assistant secretary; and **J. W. Llewellyn** and **Orwin Greiwe,** assistant treasurers.

Van C. Carr, auditor and assistant secretary of Adamson-United Co., was transferred to the Youngstown plant of the parent company UNITED ENGINEERING & FOUNDRY CO. **Mark M. Wolff** replaces Mr. Carr at Adamson-United.

Lester Crown, was elected vice-president and chemical engineer of MARBLEHEAD LIME CO., Chicago.

Harry J. Klingler will become the group executive in charge of the passenger car and truck divisions of GENERAL MOTORS CORP., Detroit. **Arnold Lenz** named general manager of the Pontiac Motor Div. **Sherrod E. Skinner** is group executive in charge of accessories divisions. **Jack F. Wolfram** named general manager of the Oldsmobile Div.

Alton J. Fabrey appointed sales representative for the eastern part of New York State by DOUBLE SEAL RING CO., Fort Worth, Tex. **Clifford J. Lane,** named sales representative for the western part of New York State.

Turn to Page 58

FREDERICK U. CONARD, elected president, Potter & Johnston Co., Pawtucket, R. I.

E. C. KLINE, elected executive vice-president and director, E S B International Corp., New York.

IRWIN F. PINK, appointed executive vice-president, Cambridge Wire Cloth Co., Cambridge, Md.

IRON AGE

salutes

fred h. mc curdy

MOST of us have definite ideas about company-employee relations. Fred H. McCurdy, president of the Brooks Oil Co., had some ideas too. One of his first acts after becoming president of the firm in 1948 was to sell his plan to the board of directors whereby the employees and management could work together. Today employees, union officials and the company are happy about the whole thing.

Fred McCurdy felt an employee should be made to feel a part of the company in order to give him an incentive to work well and carefully. This was accomplished by setting up a plan whereby earnings were split three ways: 1/3 ploughed back into the company, 1/3 as dividends to stockholders, 1/3 for providing pensions, social insurance benefits and a year-end cash bonus for employees.

Since this plan has been in effect, production at Brooks has just about doubled —with approximately the same number of employees. Of course, Mr. McCurdy realizes this plan won't work for everybody. But it has worked well for Brooks, and everybody is happy about that.

Fred McCurdy is an organizer. He likes to set things up, then let a capable staff carry the ball. He knows he doesn't have to worry from there on in. He can be tough when he has to, but seldom finds that necessary. Personally, he is about as easy to meet and talk to as the corner grocer. He is a big guy, with powerful hands and physique that could only have been developed by close association with hard work. His word is his bond. Once he makes a bargain—that's it.

JAMES GERITY, JR., named director, Doehler-Jarvis Corp., New York.

FRED C. FRAME, appointed vice-president, Kidd Drawn Steel Co., Aliquippa, Pa.

JOHN J. GOLDEN, named assistant to vice-president, Carnegie-Illinois Steel Corp., Pittsburgh.

OSCAR PEARSON, appointed steel production division superintendent, Gary Works, Carnegie-Illinois Steel Corp., Gary, Ind.

IRON AGE *introduces*

Continued

J. William Schaeffer, formerly head of the standards section, is now in charge of foundry production scheduling of HUNT-SPILLER MFG. CORP., Boston.

Walter J. Auburn has been named director of purchases for GERRARD STEEL STRAPPING CO., Chicago. Mr. Auburn has been with the company for 19 years and is also advertising manager. **Kenneth A. Smith** was appointed purchasing agent of the company.

C. G. Gehringer, appointed manager of Louisville branch of FAIRBANKS, MORSE & CO., Chicago.

L. W. Jander, named sales manager of the industrial division of HENRY DISSTON & SONS, INC., Philadelphia. He succeeds **J. F. Wilkinson,** who has resigned.

Dr. A. L. Marshall was appointed manager of the Chemistry Divisions of the Research Laboratory of GENERAL ELECTRIC CO., Schenectady. **Anthony J. Nerad** was named assistant manager and **Dr. Arthur E. Newkirk,** assistant to the manager. **Dr. William E. Cass** was elected head of the Organic Chemistry Division with **Dr. John R. Elliott** as associate head. **Dr. Herman A. Liebhafsky** heads the Analytical Chemistry Division and **Dr. Albert E. Schubert** heads the Chemical Process Engineering Division.

Ernest B. Meynard, appointed assistant sales manager of BUCKEYE TOOLS CORP., Dayton. He has been associated with the company since 1942 serving in various sales and service capacities.

Dan Burleigh, appointed manager of the machine and foundry unit of the DIAMOND MATCH CO., Barberton, Ohio.

Howard Kuhn joined HEPPENSTALL CO., Pittsburgh, member of the sales department.

Lawrence E. Shea, joined the Pacific Branch sales staff of NATIONAL RADIATOR CO., San Francisco.

R. E. Esch, formerly industrial products sales manager was appointed general sales manager of VICKERS INC., Detroit.

Sherman B. Burke, appointed Buffalo district sales manager of the HANNA FURNACE CORP.

Richard T. Purdy, appointed Washington representative of NASH-KELVINATOR CORP., Detroit.

F. J. Haller, formerly superintendent of the Mather Mine, appointed manager of the Michigan mines of CLEVELAND CLIFFS IRON CO., Cleveland.

Richard Brown, appointed director of personnel of the Ingersoll Steel Div., BORG-WARNER CORP., Kalamazoo.

John W. Merrin, appointed special representative of HUDSON MOTOR CAR CO., Detroit. He was formerly divisional sales manager for Kaiser-Frazer Corp.

Donald W. Fleser, named resident manager of the Fisher Body No. 1 plant, GENERAL MOTORS CORP., Flint, succeeding **Earl L. Klett,** transferred to Kansas City as resident manager.

O. O. Schreiber, assistant secretary, now also appointed assistant to the president of PHILCO CORP., Philadelphia.

Verner P. Mathews, appointed chief engineer of Buick Motor Div., GENERAL MOTORS CORP., Flint, succeeding Charles A. Chayne.

Geoffrey J. Letchworth, Jr., elected secretary and treasurer of the BARCALO MFG. CO., Buffalo.

Donald M. McGrath, appointed general manager of Red Bank Div., BENDIX AVIATION CORP., succeeding **W. W. Fisher,** named general manager of a new division at Davenport, Iowa.

William H. Frantz, named chairman and **Marshal L. Noel,** president, of the FRANTZ TRACTOR CO., New York.

William H. Brady retires as treasurer of the AMERICAN METALS CO., LTD. Mr. Brady will continue to serve as consultant.

OBITUARIES

Thomas P. Kirk, purchasing agent of Laclede Steel Co., St. Louis, died recently.

George H. Zirker, 51, chief metallurgist of Burndy Engineering Co., Inc., New York, died recently.

Julian Lubelski, 50, vice-president of the Warsaw Elevator & Export Co., New York, died recently.

on the assembly line

automotive news and opinions

industry, labor protest price freeze; shadow of defense program lengthens; buick production sets new high record

by walter g. patton

Price Freeze—Automobile manufacturers and the UAW-CIO are going along with the price freeze ordered last week. General Motors, Ford and Nash have agreed to roll back their price increases and Chrysler is expected to follow the same course.

However, both the companies and the union have called the price order "discriminatory." The issue is expected to be raised in Washington this week at a meeting of the wage stabilization board.

Detroit executives find it difficult to understand why Alan Valentine, ESA administrator, singled out the motor car industry for the initial government price test.

Feel Increase Moderate — The industry feels its recent price advances were moderate. It also argues that increasing the price tags on automobiles will not have a direct effect on the cost-of-living.

Walter Reuther, UAW-CIO president, has voiced his disapproval of pin-point price control that is "discriminatory." Both the companies and the union have argued that the recent government rulings do not attack at the source the basic problem of inflation.

Ford Proposal—Ford has proposed a voluntary price and wage controls plan. Under the proposal, car producers would absorb 25 pct of the increases in unit costs or the same amount of increases in the Bureau of Labor Statistics index of wholesale prices. There have been no comments by other producers on the Ford proposal.

The industry is not overlooking Walter Reuther's threat to demand new labor contracts in the event of what he may regard as an adverse wage freeze.

Objects to Wage Ceilings—While Reuther has long been an enthusiast for price rollbacks, he has just as vigorously challenged wage ceilings.

What could be gained by such a demand in the face of a wage stabilization order is difficult to figure. Also, with prices frozen, the industry would hardly be in a position to bargain with Reuther as it has been in the past.

5-Year Agreements Popular — Another important factor: the 5-year agreements are popular with GM workers. Reuther may find it advisable to think twice before any steps are taken to disturb what is generally regarded by labor and management alike as a highly workable and eminently fair wage agreement.

One theory suggested here is that the auto price freeze is simply designed to spearhead an all-out government control plan that had to be launched in some spectacular manner. Even so, the industry is none too happy about being chosen as the guinea pig.

Defense Shadow — The shadow of all-out defense has darkened the automobile industry's future. Automobile prices have been rolled back by Washington. The National Production Authority order cutting the use of copper has the auto manufacturers hanging on the ropes. The copper slash is undoubtedly the most serious restriction to date.

Executives here admit their ability to build cars in the face of a stiff copper order is strictly limited. The use of alternate materials for top and bottom radiator tanks is possible although not too desirable. Reduced radiator cores have already been ordered.

The one bright hope at the moment is that government rulings thus far have been reasonably flexible. Hardship cases have been given consideration. As long as the metals restriction framework is not too rigid the auto industry can be expected to hold its own in the battle for materials.

War Contracts — Defense contracts also made news in Detroit last week. Buick announced it will become a prime contractor on a new government order for cross-

assembly line

Continued

drive tank transmissions. Buick's plans for actually getting into production have not been announced.

Up to the present time the company is only permitted to say that it is negotiating such a contract with the Tank Automotive Center at Detroit. Ternstedt Div. of GM has its first defense contract to build fire control instruments.

Chrysler, Briggs Sign—Apparently, the automobile industry is not too concerned about what will happen to escalator clauses in labor contracts in the event of a government wage freeze. This is evidenced by the fact that Chrysler and Briggs Mfg. Co. last week signed a new 5-year cost-of-living wage contract with UAW-CIO.

In addition to an escalator clause, the new Chrysler contract provides for an annual improvement factor, new pensions, insurance and vacation benefits and provisions for a modified union shop. The contract runs to Aug. 31, 1955, with no reopenings on any subject.

Anti-Feather Bedding — Under the terms of the new contract, maximum pension benefits, including Federal Social Security, total $125 per month. Chrysler has also inserted an anti-feather bedding clause which may, as in the case of General Motors, become tremendously important in the future: i.e., recognition by the union of the principle of technological improvement and the granting by the company of an automatic 4¢ per hr improvement factor on the first of June 1951, 1952, 1953 and 1954.

Signing of the Briggs contract with practically identical provisions was reached a few days after announcement of the Chrysler wage plan. Briggs traditionally follows the wage pattern set by Chrysler. There are indications that Hudson will soon announce a cost-of-living contract.

Buick Preview — This week in Flint, Buick gave the press a preview of its 1951 models to be formally shown in January. Ivan L. Wiles, general manager of Buick Div., disclosed Buick will surpass its 1950 goal by producing 552,779 new passenger cars.

Reflecting growing acceptance of Buick is the disclosure by Wiles that more than 200,000 Buick buyers switched from other makes during the past year. For example, 70 pct of the purchasers of Buick Specials previously owned other makes of cars and 39 pct of the buyers came from outside the Big Three.

Obstacles—There are four obstacles to all-out preparation for war: (1) lack of a definite plan in Washington, (2) a manpower shortage, (3) the length of time required to retool for production, (4) long changeover periods for converting auto and other manufacturing plants to all-out war production. For instance, for almost any heavy item, a 9-month lag is the minimum.

Last week Washington seemed to have more definite ideas about what it wants done. The manpower problem may partially solve itself, but if it does it will be at the expense of Detroit workers who may be laid off for prolonged periods waiting for arms production to get under way.

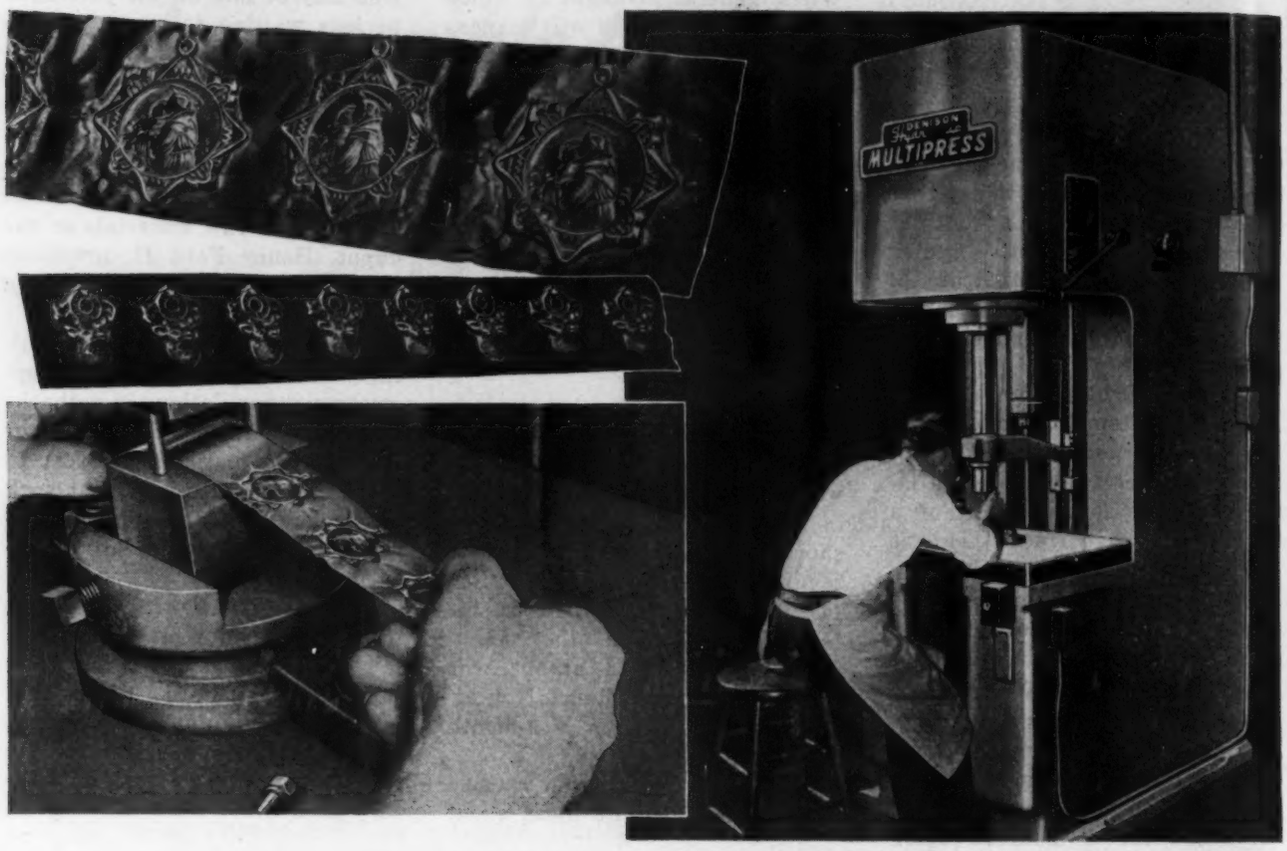
Ford Will Convert—To those who may be wondering what the automobile industry will do in the event of extensive government restrictions on raw materials or car ouput, Henry Ford II, president of Ford Motor Co., gave a specific answer last week.

Ford said his company will willingly and without protest accept emergency regulations in cutbacks in production schedules whenever it is in the national interest to do so. Ford asked only that such emergency action be taken systematically and with full disclosure of the necessity.

The young executive argued it would be silly for his company to lay off men without a compelling reason. Young Ford believes that cutbacks on civilian goods should, as far as possible, allow men to transfer directly to work on military goods.

THE BULL OF THE WOODS — **By J. R. Williams**

Costs slashed on fine-detail stampings



Multipress does a better job — *three times faster* — with smoother, easier controlled ram action and lower tonnages.

Things really happened at the Irons and Russell Co., of Providence, Rhode Island, when they switched to Multipress for some of their top-quality stamping operations.

Production climbed to three times the previous rate, while design details on the emblems and medals came through sharper and clearer than ever before. And scrap losses took a nose-dive.

The oil-smooth, pressure control and accuracy of Multipress—plus its exclusive Vibratory-action that applies a series of short, rapid, repeat strokes with each ram effort—brought many other operating advantages.

For example, tonnage requirements on many jobs dropped as much as 25%. This reduced wear on dies and reduced the danger of die breakage.

Down-time for die changes was cut in half, and in many cases annealing of the strip metal between operations was no longer required.

In addition, top-quality work could be turned out on Multipress using operators with no special skill or training. Operator fatigue was reduced, safety was increased, and operators like the smoother, quieter operation.

These are just a few of the reasons why there's so much excitement over the efficiency of the Multipress in the jewelry field—or in any industry handling production jobs where *pressure* does the work!

Multipress is built in eight different frame sizes, with capacities from one to 50 tons. Many exclusive, job-speeding Multipress accessories also available, for special types of work. Six and 12 station indexing tables provide fast, safe, accurate feeding of parts to the press ram. Denison's stock-feed accessory attains speeds up to *50,000 parts per hour* on small blanking, punching and forming jobs, from continuous, rolled strips. Also foil-marking, pelleting, straightening and many other attachments. Write for full details.

The DENISON Engineering Company
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MULTIPRESS®

west coast progress report

digest of far west industrial activity

by r. t. reinhardt

Need Another Blast Furnace—At least one additional blast furnace and possibly two must be added to far western facilities within the next year or two, according to planners and analysts. Whether it will be at Fontana, Geneva or on tidewater on San Francisco Bay will probably depend upon the competitive strategy and tactics and relative expansiveness of Kaiser, U. S. Steel Corp. and Bethlehem Pacific respectively.

Prewar the Pacific Coast got along on one 600 ton a day furnace at Provo, Utah. Present combined daily output of 6900 tons at Fontana, Provo and Geneva is at least 1000 and probably 2000 tons short.

Cast Pipe Demand—By midyear in 1951 the new foundry of United States Pipe & Foundry Co. at Decoto out of Oakland is scheduled for completion with probable production of 50,000 tons a year of pressure cast pipe. Austin Co. has started construction on the $2½ to $3 million plant on a 70-acre site, now ready for structural steel. Unofficially assumed source of supply for pig iron is Geneva. This substantial new customer will further overdraw the Far West's cast iron bank account and make things tougher. Demand for cast will take the road up.

Utah Producer Expanded—Last year Pacific States Cast Iron Pipe Co. completed its $3½ million modernized plant at Provo with capacity of 100,000 tons a year. This plant is also a Geneva customer whose demand is ten times what it was in 1926 when first established as a Columbia affiliate.

Pig Iron Imported—To compensate for the consistent postwar scrap deficiency on the West Coast, Bethlehem Pacific has been importing substantial tonnages of pig iron from India, Japan, Chile, Europe and even Africa. There is no prospect of more scrap, so that consistent demand for more pig than now produced is indisputable in the future unless there should be an end to the major oil and gas transmission pipe line contracts which now absorb so many plates. What Washington is planning for the pipe line industry is the crux.

Steel from Overseas—From Belgium, France, Germany and Japan significant tonnages of bars and light shapes, nails and barbed wire, sheets, pipe and fittings are being received monthly on the West Coast, principally at Los Angeles harbor. According to the Los Angeles office of importers Winter Wolff & Co. several thousand tons have been received and immediately placed in the last 2 months, all but sheets selling so far at competitive market prices.

Quantity Discounts Reduced—Warehouses in southern California have reduced former quantity discounts on carbon steel as follows: on 10,000 to 19,999 lbs, from 20¢ to 10¢; over 20,000 lbs from 40¢ to 20¢.

Where's Any Zinc?—Galvanizing plants at Los Angeles and San Francisco are completely down or gasping for lack of zinc. Even DO priorities are reported useless. A meeting of galvanizers at Los Angeles last week to present the critical shortage situation to Washington has so far proved fruitless. Substantial black market stocks are reported available at 30 to 35¢ a lb, a price that is from 50 to 75 pct above listed market.

Few War Orders—Except for the aircraft industry at Los Angeles, Seattle and San Diego and Atomic Energy Commission projects in Washington, Idaho and New Mexico, whose combined requirements for ferrous metals are comparatively insignificant, there have been so far no substantial volume of DO orders or war contracts in the Far West. What DO orders are placed come from government agencies for miscellaneous supplies.

the federal view

this week in washington

by eugene j. hardy

New Freight Cars—The National Production Authority has asked the Defense Transportation Administration why it has not urged railroads to order the new Unicel combination refrigerator-boxcar if the need for freight cars is so acute as to require steel allocations for 10,000 cars a month. The new car, constructed of cellular laminated plywood, is estimated to require 20 tons less steel per car. Since NPA contemplates cutting back the freight car steel allocation, DTA might take such action.

Depreciation Squawks—You can expect the new Congress to look sharply into the administration of the accelerated depreciation program by the National Security Resources Board. Some business groups, sparked by the Chamber of Commerce, are complaining that NSRB is not following the intent of congress.

Contention is that NSRB is not approving a full 5-year write-off, but allowing percentages based on regulations which give consideration to "the probable economic usefulness for other than defense purposes after 5 years." The Senate Finance Committee staff is now investigating these charges.

Basing Point Bill—A key Senate committee, criticizing the Federal Trade Commission for failure to take a single step toward clarification of the 3-year-old basing point issue, is urging the incoming Congress to make a fresh try at solving the problem through new legislation.

Senator Edwin C. Johnson, D., Colo., said last week he had directed the staff of the Senate Commerce Committee to prepare such legislation for action by the new Congress.

No Steps Taken—In the 6 months that have elapsed since the veto of S. 1008 (the bill declaring the legality of competitive freight absorption which passed both Senate and House), the FTC "does not appear to have taken any step toward a clarification of the law," Johnson stated.

The committee notes that "there is a feeling in many quarters" that FTC has altered its views on freight absorption recently, while refusing officially to concede any change in its position. The committee said it could not assail steel sellers for refusing to absorb freight in the absence of congressional ability to advise them that it is lawful to do so.

Anti-Merger Bill Passes—The Federal Trade Commission has chalked up victory in its 25-year-old battle for an anti-merger law with "teeth" in it. But just what kind of business consolidations are permissible—and what are not—has yet to be defined by the government's anti-monopoly strategists.

Prior to passage of the new law, the Clayton Act of 1914 prohibited any company from buying the stock of a competitor if the effect would result in a lessening of competition. Under the new act, which incidentally cleared both Senate and House by wide margins, the prohibition is extended to cover purchase of physical assets of competitors.

Biding Their Time—Both the FTC and the Justice Dept. decline to state in advance what they think "lessening of competition" means. Showing the usual bureaucratic concern for keeping Federal officeholders occupied, they reply that they'll have to wait until they have "a few test cases to go by."

Senator O'Conor, D., Md., sponsor of the bill in the upper chamber, says this is a question that "only the courts and agencies can answer as specific cases arise."

Metalworking Data—The Bureau of Census will soon begin to conduct annual surveys in two metalworking fields where production and shipment data have been lacking. These surveys will cover shipments and production by model of internal combustion engines and metalworking machinery. The data collected will be similar to that now contained in the annual machine-tool survey. The first survey will cover the calendar year, 1950.

Signal of Security

Though tiny in terms of illuminating power, the glimmer of a Christmas Candle is in many ways the most piercing light in the world. For to those who would alter the meaning of American freedom, this glowing flame stands as a symbol of renewed faith in our Creator and in our inalienable rights to life, liberty and the pursuit of happiness.

Again this year it is our sincerest wish that the warming glow of the Christmas Spirit will burn brightly for you and yours. And we join with you in joy and thankfulness for our many blessings in this great land of ours.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. STEEL-SERVICE PLANTS AT: NEW YORK • BOSTON • DETROIT

PHILADELPHIA • CINCINNATI • CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

3 Million Axle Shafts Induction Hardened

By S. L. WIDRIG
Chief Metallurgical Engineer,
Spicer Mfg. Corp.,
Toledo
and C. A. PAYNTOR
Chief Metallurgist,
Salisbury Axle Div., Dana Corp.,
Fort Wayne, Ind.

Improved physical properties and reduced production costs through use of plain carbon steel instead of alloy grades were achieved by induction hardening axle shafts. Production was increased and some operations were eliminated by this method.

INDUCTION hardening of axle shafts has proved economically sound, and is shown to possess many advantages over the standard method of through hardening. Pioneered by the Salisbury Axle Div., Dana Corp., Fort Wayne, Ind., the method has been used exclusively during the past 4 years on a production basis. Substantial savings have been realized through increased production and elimination of various operations. In addition, alloy steels previously required to produce desired physical properties in through hardened shafts have now been replaced by plain carbon steel; properties after induction hardening are considerably improved.

A comprehensive testing program was initiated early in 1944 at Spicer Mfg. Corp., Toledo, and the experimental work was completed at the Salisbury plant. Results of tests were so gratifying that several high speed, fully automatic, multi-station machines were designed and built. This manufacturing innovation operating directly on the production lines assures positive control of depth of hardening, microstructure and hardness. Each machine is loaded and unloaded at the same station by a single operator. Working conditions are much more pleasant than prevail in the vicinity of fuel fired furnaces, due to the absence of radiant heat and combustion gases.

Essentially, each of the three axle-hardening machines, built by Snyder Tool & Engineering

FIG. 1—Layout of the equipment for induction hardening axle shafts at the Salisbury plant, showing the Snyder machine (facing operator) and the Tocco units.

Co., Detroit, consists of a six-station rotating member which carries and processes six axle shafts at various stages of operation. Rollers on the rotating member, guided by a cam track on the stationary member, actuate the vertical movement of the axle shaft down through the inductor block as the shaft is progressively heated and quenched. After the downward travel or hardening cycle has been completed, the shaft returns to the high level position for the unloading operation. Each Snyder unit is fed by two 125-kw, 9600-cycle Tocco induction generators, made by Ohio Crankshaft Co., Cleveland. The even-number stations on the Snyder unit are fed by one Tocco unit while the odd-number stations are fed by the other.

Heat Control Important

The on-and-off controls of power and quenching water are automatically actuated by limit switches, which are very easily adjusted to accommodate shafts of various lengths. Inasmuch as only four stations require power at any one time (two stations per generator) and since the proximity of the coupling between the shaft and inductor block determines the relative power demand, it is possible to obtain about 70 kw input on tight coupling. While one station is drawing 70 kw input, the other station, fed by the same generator, is positioning the tapered axle shaft at a greater coupling distance and consequently is drawing a reduced power input of less than 50 kw.

These figures are of a relative nature and represent the maximum power available from the equipment. Actually, 60 kw input on tight coupling has been the peak figure used on production shafts. Consistent heat input from one station to another is very important and necessitates proper voltage regulation.

The quenching water is contained in a closed system, fed from a 3500-gal storage tank. No water treatment is necessary, but a substantial quantity of make up water is added each day to compensate for evaporation losses. Two evaporator coolers are operated continuously to maintain the required temperature, which may vary from 90° to 135°F. The generators are cooled by a separate water system fed from a 1500-gal storage tank. The water temperature in this system is maintained at 90° to 100°F by another evaporator cooler.

The inductor blocks are designed to permit desired radial clearance between the ID of the block and the maximum and minimum diameter of the shaft during its vertical travel. The under side of the block contains relatively large quench holes, through which the quench water is directed at the proper angle to the shaft. This rather generous supply of quench water serves the function of cooling the inductor block as well as quenching the axle shaft.

Automatically Transferred

Next to each Snyder unit is a remote control station. This supplies power for a coil designed to uniformly heat the short taper section of the shaft, providing an auxiliary drawing operation on this section. The source of power for these

three remote control stations is a 50-kw, 9600-cycle Tocco generator; each station requires about 16 kw for its operation. After this operation, the shafts from all three Snyder units are placed on a conveyer chain which automatically transfers them to the conveyer chain of a recirculatory continuous draw furnace supplied by Surface Combustion Corp., Toledo. The layout of the equipment is shown in Fig. 1.

Continuous operation of the Snyder unit produces axle shafts at the rate of 120 per hr. The complete cycle of travel for each individual shaft is 3 min from loading to unloading; however, since there are six stations in operation, a shaft is produced every 30 sec. The rate of downward travel of the shaft during the hardening cycle is 0.277 ips and the rate of rotation upon its own axis during this downward travel is 76 rpm. After the hardening operation, the shaft is locally heated and drawn for 20 sec in the short taper area on the remote control induction draw unit. It is then immediately conveyed to the continuous draw furnace operating at 525°F on a cycle of 1¼ hr.

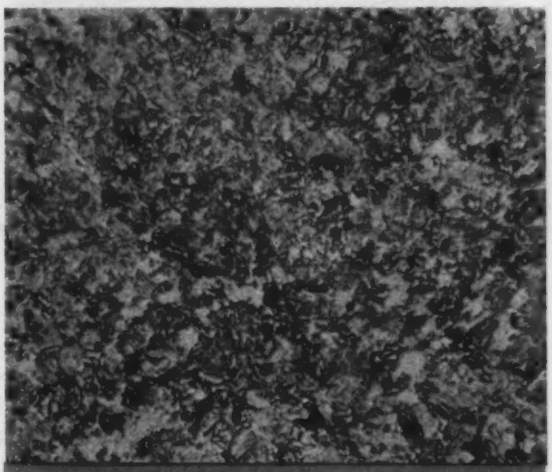


FIG. 2—Hardened and drawn structure obtained 0.100 in. from the surface of an induction hardened shaft. 500X.

The total depth of induction heating is from 0.200 to 0.250 in., while the effectively hardened depth measures 0.100 to 0.120 in. Traces, but no appreciable quantities, of free ferrite are present within the effectively hardened area at a depth of 0.100 to 0.120 in. Fig. 2 shows the hardened and drawn structure. The effective hardness depth and the total depth of heating remain fairly uniform, as shown in Fig. 3, despite the diameter change in the shaft from one point to another. As the diameter of the shaft decreases, the coupling between the inductor and the shaft increases and the power input is reduced.

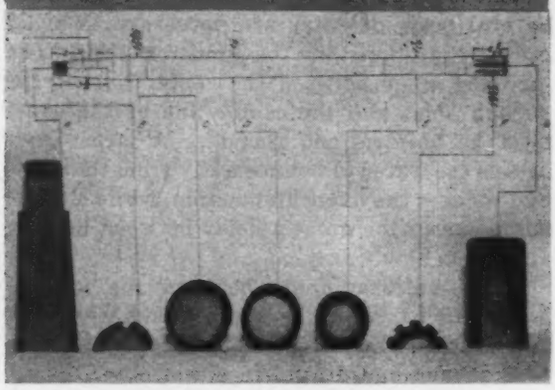
On the other hand, the mass of metal heated at this point is relatively less, and the depth of heating remains reasonably constant. Since the direction of travel of the shaft thru the inductor block is from spline end to taper end, the hardening of the thrust face on the spline end of the shaft becomes relatively simple.

Insures Better Quenching

Initial loading of the shaft between centers positions the spline end ⅛ in. below the upper level of the inductor block. It remains in this position for 8 sec with power on before starting downward travel, during which time the end of the shaft is heated well above the critical temperature. After the shaft starts its downward travel, the quench water is released by limit switch control and the hardening cycle progresses. To insure good quenching action on the end of the shaft, a splash cup is built on the lower center.

The axle shaft is manufactured from C-1033 material and will show a surface hardness of 52 to 56 Rc in the as-hardened state. After 1¼ hr at 525°F in the continuous draw furnace, the surface hardness is drawn back to 42 to 48 Rc. The transverse hardness gradient from surface to core, measured in the bearing section, is shown in Fig. 4. These hardness figures apply to all hardened sections of the shaft except the unhardened thread section and the short taper area, in which area the induction draw reduces the hardness to 34 to 38 Rc.

FIG. 3—Uniform hardness depth and total depth of heating, despite varying diameters in the shaft, are shown by the various segments below. Diagram shows points from which specimens were taken.



The application of allowable stresses permits a lower hardness in this section. The lower hardness in turn permits a more efficient keyway milling operation. It was not found practical to attempt milling the keyway in the green and retain size control after hardening.

Progressive heating of shafts by induction and progressive quenching is not an entirely new process. The installation at Salisbury,

however, is the first application of such a method to axle shafts in which diameter sections vary from 1.094 to 1.625 in. In this case, the surface conditions vary from a machined spline to an unmachined body section having several thousandths decarburization. Consequently, the initial problems were numerous.

First attempts were to harden the shaft from C-1045 steel; despite all known preventative measures, about 50 pct of the shafts were scrapped because of small longitudinal hardening cracks occurring on the sides of the splines and usually originating at the root radius. Further test work proved C-1033 to be the material most adaptable to this particular induction application. In effect, the 1033 analysis became a compromise between hardening qualities and the elimination of hardening cracks in intricately shaped sections.

Minor Defects Unimportant

Rigid requirements were initially specified relative to seams and other surface defects. However, after several years of field experience and considerable test work, it was found that minor surface defects are not as important as originally assumed. Certain quality standards concerning surface condition must still be maintained on the induction hardened shaft, the same as on the through hardened alloy shaft quenched in oil.

More development work was performed on the problem of applying quenching water to the shaft through holes in the inductor block than on any other single item. The pattern of quench water must be uniform, continuous and sufficient as it strikes the periphery of the shaft. Several ports of entry are necessary to avoid pressure drop within the inductor block. The included angle between the center line of the quench holes and the center line of the shaft must be uniform and correct. A large angle causes the water to bounce away from the shaft and reduces the quenching action, while a small angle causes too great a delay between heating and quenching.

A non-uniform angle between the various holes will cause either a prequench and high temperature draw from the adjacent area or a post quench and draw. In either case, the result is a soft line the full length of the shaft. This line, when combined with the rotational movement of the shaft, becomes a spiral and may drop as low as 20 to 25 Rc and extend in width for possibly ¼ in.

The first block that was used contained a multitude of 1/32-in. holes and provided a flow of about 5 gpm. This reduced flow was insufficient to provide good quenching properties, particularly in the area below the oil seal shoulder. Subsequent tests, directed to equalized pressure reduction and increased flow, resulted in increased hole size and sufficient flow to provide deep quenching properties, even below the oil seal shoulder.

The constant rate of vertical travel of the shaft was found to be quite satisfactory except for one particular section. As the heating effect of the inductor block passes from the spline to the adjacent bearing section, there is a rather sudden change of mass while the bearing diameter remains the same as the major spline diameter. This results in an electrical lag of insufficient power input to maintain a uniform heat pattern. A very substantial reduction in heating depth and surface temperature of the heated area occurs, reducing surface hardness as much as 6 to 8 Rc. The microstructure of this section shows incomplete solution and poor hardening characteristics.

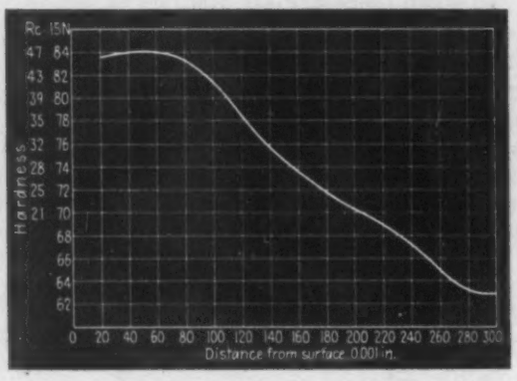


FIG. 4—Depth of hardness curve, giving the transverse hardness gradient from surface to core in the bearing section of the shaft.

Cam Track Redesigned

An increase of power input increases the temperature in this critical area. Such a measure was not desirable, however, since the effect of increased power was applied to the full length of the shaft. It became necessary to redesign the cam track in such a manner that the rate of vertical movement of the shaft was slowed down about 20 pct during its travel through this critical area. This eliminated the ill effect of the mass change, and the heat pattern blended out to a constant temperature and depth.

The Snyder machine was originally designed to rotate the shaft during its downward hardening cycle. It was believed that such a rotational movement would lend itself to producing less runout in the heat treated shaft; subsequent tests bore this out. The rotational movement of the shaft, however, produced an undesirable condition in the spline area.

As the spline section rotated against radial quenching action, there was a tendency to blanket out the following side of the spline. Transverse microstructures taken in the spline area showed incomplete solution. Limit switches were re-adjusted in order to eliminate rotation as the spline section was being heated and quenched. After the spline has passed through the inductor block, shaft rotation starts and continues for the balance of the cycle.

An evenly machined straight green shaft free plants maintain strict metallurgical control over the operation. Forging furnace temperatures, finishing temperatures and grain refinement must all be carefully watched and controlled. Some runout is picked up from center chucking in machining operations, but the runout increase during induction hardening is only 0.003 to 0.004 in. Although the straightening operation after hardening is now relatively slight and fast, it is quite possible that eventually it may be entirely eliminated.

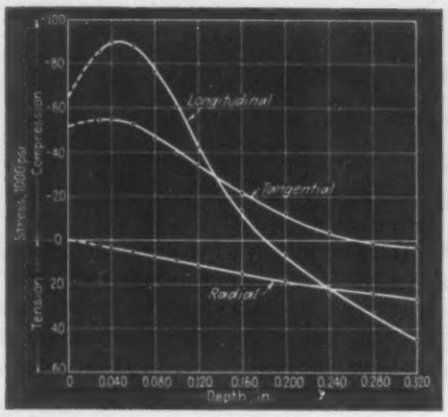


FIG. 5—Residual stresses calculated in the induction hardened bars of SAE 1033 steel, not tempered; bar diam is 1.245 in.

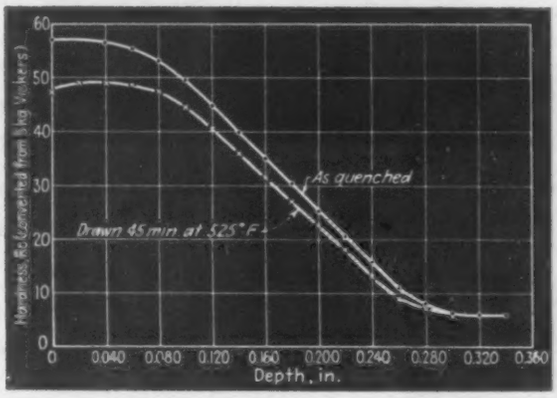


FIG. 6—Hardness traverse of the induction hardened bars, used in determining the residual stresses. Curves are plotted from average of readings on four or more diameters.

of strains can be induction hardened with very little increase in runout. There is a definite straightness advantage in the fact that the center section is not heated and tends to hold the shaft in alignment. On the other hand, a green shaft highly strained from cold straightening operations may run out as much as 0.250 in. in the induction hardening operation.

Tests revealed that the hot shaft in the as-forged condition from the trim press is relatively straight. Uneven cooling rates at this point tend to produce warpage. Test lots were vertically suspended from the forging operation and allowed to cool in still air.

Forged Shaft Was Straight

No straightening prior to machining was necessary on shafts processed in this manner, since they measured about 0.040 to 0.045 in. with a high of 0.080 in. total indicated runout, including out-of-round. Runout checks were then repeated immediately before and after hardening and revealed an average runout increase of only 0.003 to 0.004 in. as a result of the induction hardening operation. Normalizing was eliminated.

All shafts are slowly cooled in vertical suspension from the forging operation and no green straightening operations are necessary prior to machining. Under these conditions it becomes increasingly important that the forge

It was deemed advisable to run a pilot lot of thirty shafts from each new heat of steel before the balance of the shafts from the heat are released to production. The variation from high to low chemistry and hardenability within the AISI specification range of S-1033 requires changes in the induction hardening procedure.

Hardness Pattern Controlled

By use of the induction process, the depth of the hardened shell and the induced stresses can be closely controlled and maintained. Fig. 5 shows the residual stresses in the case of an induction hardened bar of SAE-1033 steel 1.245 in. in diam. These stresses were calculated by the Sachs method using strain gages to measure the longitudinal and circumferential movement on the OD after machining progressively larger holes longitudinally through the center. The hardness gradient across the case of the bar is shown in Fig. 6, and simulates the average gradient obtained in production.

In its present status, the induction hardened axle shaft is economical to produce and successful in field operation. Manufacturing and material costs are reduced considerably below comparative costs of the oil hardened alloy shaft. About 3,000,000 induction hardened shafts have been produced in the past 4 years and are in passenger car operation today. Not a single failure has been reported.

Metalworking Research Reaches

ARMOUR RESEARCH FOUNDATION
—Fifth of a Series—

By **ROBERT A. LUBKER**
Asst. Chairman, Metals Research,
Armour Research Foundation, Chicago

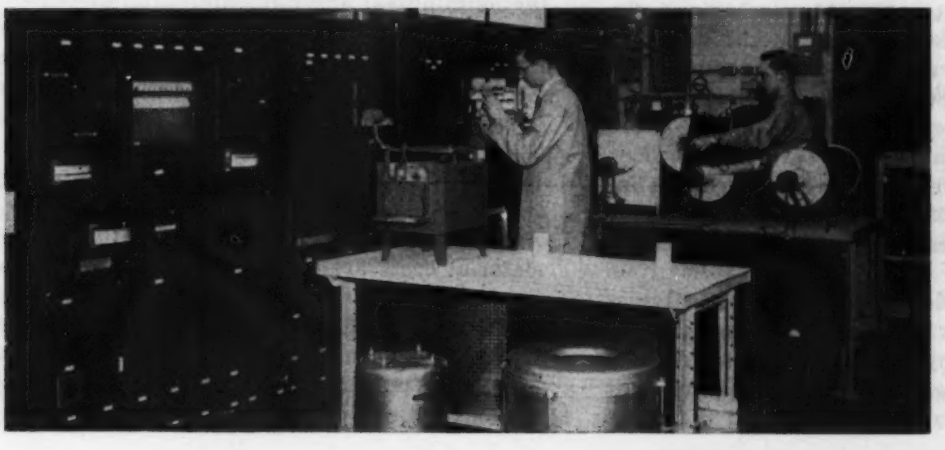
Since its founding in 1936, Armour has grown from a 3-man staff and a volume of $40,000 to a staff of over 670 handling an average of 300 projects a year with an annual research volume of $4¼ million. Its metals department employs 71, currently working on 25 projects at an annual rate of $760,000. Both small and large firms, trade associations, and government agencies, are sponsors.

Armour Research Foundation of Illinois Institute of Technology was established in 1936 with an original staff of three scientists operating on a research volume of $40,000. Today a staff of over 670 handles some 300 projects a year with a volume of research expenditures exceeding $4,250,000 annually. Floor space for laboratories, shops, and offices amounts to about three and one-half acres.

The research staff is organized into six departments: Physics, chemistry and chemical engineering, applied mechanics, electrical engineering, ceramics and minerals, and metals research.

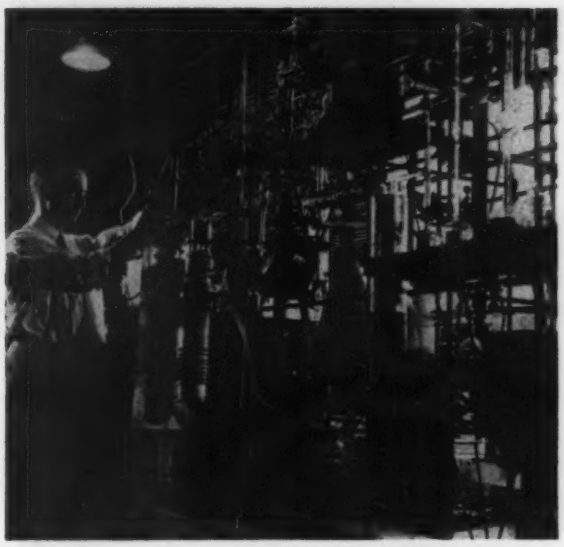
The metals research department of the foundation has a staff of 71 organized into seven sections: Ferrous metals, non-ferrous metals, welding, foundry, heat treating and powder metallurgy, electrochemistry and extraction metallurgy. It is currently working on 25 projects at an annual rate of $760,000. Seventy per cent of this research is industrially sponsored; 30 pct is for government agencies.

There is considerable variation in the size of projects, depending on the scope of the problem assigned to the foundation. Several small projects have been successfully completed in a few weeks for about $2000. Other projects have cost several hundred thousand dollars. A typical metallurgical project might involve



PHYSICAL metallurgical laboratory at the Armour Research Foundation of the Illinois Institute of Technology.

All-Time High



VACUUM fusion analysis of gases in metals is investigated at Armour with this apparatus.

an expenditure of $15,000 over a period of a year.

Companies sponsoring work in metallurgy at the foundation vary from a capitalization of about $200,000 to multimillion dollar corporations. Most of the research has been carried out for medium sized and large concerns. Small companies, however, do benefit directly and indirectly from metals research at the foundation. Members of trade associations sponsoring projects at Armour benefit equally, regardless of size. There is a wide variety of talent and equipment available to the management of smaller companies.

Equipment is Extensive

Mechanical testing equipment includes a 60,000-lb Baldwin Southwark Universal tester, a universal Sonntag impact tester set up for work down to −320°F, a Baldwin universal fatigue tester, and Vickers, Tucon, Rockwell and Brinell hardness testing equipment. More extensive tensile (up to 400,000-lb capacity), fatigue and special facilities are available through the Applied Mechanics laboratories of the foundation. Considerable research scale heat treating and sintering furnaces are available with a complete variation in vacuum and atmosphere control. Part of these furnaces are designed for high temperature operation (3100°F) by means of special molybdenum windings. Extensive electrical and magnetic testing facilities are maintained in the foundation.

A complete metallographic laboratory is available including a Bausch & Lomb research metallograph, a Bausch & Lomb MILS metallograph, and dark rooms. An electron microscope, X-ray diffraction apparatus, an electron diffraction unit, and spectrographic equipment are maintained in cooperation with the Physics department.

Two special arc melting units are available for making castings of high temperature or unusually reactive metals such as titanium, vanadium, molybdenum and tungsten. One utilizes a tungsten electrode to strike an arc against a water-cooled copper mold. The second permits complete freedom from contamination by striking the arc from an electrode of the metal or alloy being melted. This electrode, prepared by powder metallurgy techniques, is fed through an automatic feed mechanism as it melts into the water-cooled copper mold. Both furnaces can operate with vacuum or inert gas atmospheres.

Facilities for metal fabrication include a

A 75-TON PRESS and high-temperature sintering furnace are among Armour's powder metallurgy laboratory equipment.

HIGH-SPEED photography of pouring operations is used in studies of gating design being made at Armour.

Metalworking Research

Continued

150-lb Bradley forge hammer, a 7-in. rolling mill, swaging machines, a 1200-ton draw press and wire drawing equipment.

Started on Foundry Research

The Metals department of the foundation was first organized in the field of foundry research and, therefore, is able to offer one of the most complete foundry research laboratories available to industry. Melting equipment includes a range of induction melting furnaces from 50 to 600-lb capacity of steel, a No. 1 Whiting cupola with a capacity of 3000 lb of gray iron per hr, a 250-lb Detroit arc furnace, and a 1000-lb side blow converter. A complete pattern shop and very extensive sand facilities are available. Castings can be finished in a large shot blasting machine and heat treated in facilities described in the next section. High speed photography has been a valuable tool for study of gating and risering methods.

Extensive commercial-size heat treating facilities are maintained. Oil and water quench tanks and a salt bath are also available.

Induction heat-treating facilities include a 15-KVA, 540,000-cycle General Electric unit, a 30-KVA variable frequency Van Norman unit, and a 100-KW, 9600-cycle Tocco unit.

The required powder preparation and mixing equipment, sintering furnaces and presses are available for powder metallurgy work. Various reducing and vacuum atmospheres and temperatures up to 3200°F are used for sintering. Fifty, 75 and 1200 ton capacity presses are used in the powder metallurgy laboratory.

The necessary facilities for work in arc, gas and resistance welding are available at the foundation. Equipment includes a 50-KW Sciaky inductance discharge spot welder, a Federal Unipulse condenser-discharge spot welder having a capacity equivalent to 250 KVA, a 5-KVA Federal flash welder, a 600-KVA National projection welder, and a 280-KVA Sciaky seam welder. Also available are a Lincoln automatic arc welder, a specially built automatic arc welding unit designed to handle argon, helium, hydrogen, and other important gas combinations with superimposed high frequency, power units for manual ac and dc arc welding, and gas welding facilities.

The necessary equipment for electroplating, corrosion, electropolishing, electroforming and battery research studies is available. Special equipment in this laboratory includes vacuum fusion apparatus for analyzing the hydrogen, oxygen and nitrogen content of metal samples, and an experimental unit in which the electrochemical currents involved in corrosion can be amplified and recorded on an oscillograph.

The wide scope of metals research activity at the foundation can best be illustrated by reporting briefly on a portion of the projects which are current or have been completed within the last few months.

The fourth in a series of investigations for Kennecott Copper Corp. on the role of molybdenum in steel dealt with the effects of molybdenum and phosphorus on the toughness of incompletely hardened 5140 and 1340 steels. In the slack quenched steels, as in steels fully hardened to martensite before tempering, a progressive decrease in toughness was observed as the phosphorus content was raised within commercial limits for openhearth alloy steels. When molybdenum replaced part of the manganese or chromium in these grades, the effect of phosphorus was counteracted to a marked extent especially when the steel was cooled slowly after tempering.

Palm Oil Substitutes

During the past year two substitutes for palm oil in hot dip tinning were successfully tested on a full mill scale; one of these appears to be especially promising in regard to domestic supply, quality, and economics. This project was sponsored by The American Iron and Steel Institute.

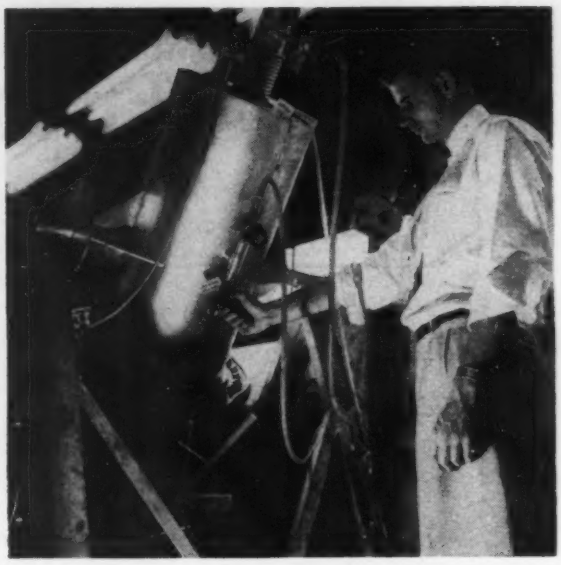
Powder metal processes are being used in a continued investigation to develop rock drilling materials under industrial sponsorship. In addition to the usual laboratory evaluation tests, this program includes full-scale operation of experimental materials under controlled rock-working conditions.

Under sponsorship of the NEPA Division of Fairchild Engine and Airplane Corporation, protective sheaths have been developed for the tungsten-iridium thermocouple. This has re-

sulted in an assembly that is useful for measuring temperatures up to 1950°C in oxidizing environments.

After abrasion testing many brick mold materials under simulated service conditions in the laboratory, a selected group of alloys was evaluated in full-scale brick manufacture. This critical appraisal led to the selection of the mold liner material having optimum abrasion and toughness characteristics. This program was sponsored by the Chisholm, Boyd & White Co.

The rapid wear of hammers in modern impact pulverizers was improved through a research program sponsored by the Industrial Research Foundation. The Armour abrasion tester provided a laboratory evaluation of fabrication techniques embodying abrasion resistant metallic materials, and full-scale evaluation confirmed the applicability of these data to actual pulverizing conditions.



SPECIAL high-temperature molybdenum resistance furnace is part of Armour's extensive metallurgical research equipment.

Hot Abrasion Test Development

Abrasion research for the Allegheny Ludlum Steel Corporation has led to an elevated temperature abrasion test. By simulating conditions that are difficult to evaluate on a full-scale in industry, this test yields useful information for the development of superior abrasion resistant alloys.

Work was continued on the fundamental investigation of welding arcs for the Lincoln Electric Company. The objective of these studies is to learn about basic phenomena. Considerable improvement in existing welding methods and procedures and possible new methods should result from a better understanding of such fundamentals.

The effects of additions of metallic sodium to molten steel are being investigated. Changes in physical properties, sulphur and oxide content, type of inclusions, etc., are being used as criteria. The program is under the sponsorship of the National Distillers Products Corp.

A project initiated by the Steel Founders Society of America to evaluate various molding materials in terms of the rate of solidification of steel castings has been brought to a successful conclusion. This work demonstrated the use of various minerals as inserts to both accelerate and retard heat loss from the molten steel. Knowing the comparative influence of such inserts on solidification has enabled the foundryman to gain added control of the shrinkage which occurs upon solidification. The Society reprinted the final report on this project and distributed it to its membership throughout the country.

Support of this project was made possible by a fund for fundamental research provided by the American Steel Foundries. A number of relationships were derived analytically to show the amount of metal flow from various gating systems in terms of their dimensions. The theory was checked and adjusted through appropriate experimentation under actual foundry conditions. This has resulted in the first information that will enable the foundryman to dimension the gating system of a mold without trial and error.

In its second year, a research program sponsored by the American Foundrymen's Society has provided information about the influence of mold materials on the contraction of a casting. The methods whereby changes in the ingredients of a sand mix can cause the formation of the defect known as a hot tear have been demonstrated.

This program is a continuation of the previous year's work on the same subject. It was sponsored by the Steel Founders Society of America to obtain information about the influence of gate design on the flow of steel as it moves through a mold cavity. A photographic technique was employed to give a color motion picture. Information gained has proven to be exceptionally stimulating to the foundrymen who view this film.

Other Projects Listed

Other metalworking projects of interest include a study of the flow of molten steel in sand; development of a method of quality control for foundries, including statistical control methods; and a study directed toward elimination of tarnishing in high-quality silver plated lamps. New techniques for studying the fundamentals of tinplate corrosion were evolved during the year in a continuing program for the Inland Steel Co. Data being obtained is requiring some revision of current beliefs about steel protection by tin.

Welded Pump Rotor SAVES MACHINING

By B. J. ROSEN
District Engineer,
Eutectic Welding Alloys Corp.,
New York

As a one-piece part, a pump rotor required too much complicated machining. When made in halves, machining is simpler and less steps are required. Despite cost of assembly of halves by welding, the new method reduces overall production costs.

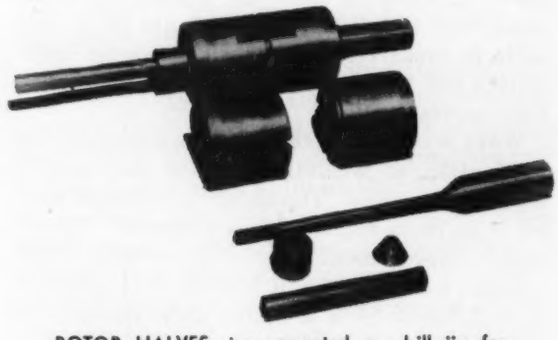
USUALLY, it is considered good practice to combine component parts as much as possible. This reduces the number of setups for machining, and cuts assembly costs. Sometimes, though, the reverse is true. Foster Pump Works, of Brooklyn, has found out that they can produce one of their pump parts quicker, easier and cheaper by cutting it in half, machining each half separately, then welding the halves back together again.

The part is a steel rotor for a rotary pump of the oscillating blade variety. The rotor turns about a center which is offset from the center of the cylinder bore. Liquid is drawn from one side of the pump, filling the clearance spaces bounded by the blades, the rotor and the casing. As the rotor turns, the offset causes the clearance spaces to decrease in volume, the blades retracting into rotor slots, forcing the liquid out the discharge side of the pump. This construction allows for complete reversibility.

Until recently, Foster has been following usual methods of producing the SAE 1045 steel rotors. Operations included drilling a hole through the center, turning to size, and milling four slots for the blades. Each slot was milled individually by feeding the cutter in vertically.

Method Was Unsatisfactory

Aside from the fact that this was a time-consuming sequence of operations, it has some other serious drawbacks. For one thing, a cutter which would produce the right diameter wouldn't produce enough depth. So the hole through the center had to be enlarged in diameter along the length of the slots. This not only increased machining time, but considerably reduced the bearing surface between rotor slots and blades. Also, the ends of each of the four slots had to be broached to remove the radius left by the milling cutter. Not infrequently, the slots then had to be filed to remove the shoulder left by the broach or to correct an undersize cut of the milling cutter.



ROTOR HALVES, top, mounted on drill jig for welding. Center, halves ready for welding. Bottom, elements of spindle welding jig.

Foster decided that there simply must be a better way of doing it. A suggestion was made to cut the rotor in half, through-mill the four slots, and then weld the two halves back together before turning to size. This was tried, and it worked.

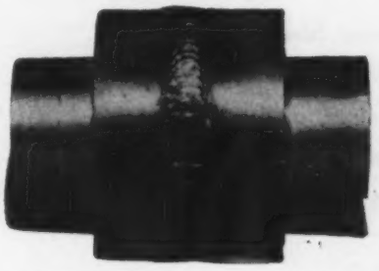
However, for their one-piece rotors, the company had been using high-carbon steel for its greater strength and hardness. This high-carbon steel could not be welded, so a low-carbon nickel-moly alloy steel was substituted in the new welded rotors. This maintained high strength and hardness, as well as giving satisfactory weldability.

But even with this low-carbon steel, the weld left two rings of hard metal where the base

The Old and The New

Original Method	New Method
1. Cut stock.	1. Cut stock.
2. Face ends.	2. Face ends.
3. Drill hole, countersink, and undercut hole.	3. Drill hole and countersink.
4. Rough turn OD.	4. Cut radius for welding.
5. Rough and finish turn journal diameters.	5. Rough and finish turn journal diameters.
6. Mill four slots individually.	6. Through mill, two slots at a time.
7. Broach to remove radii.	7. Weld rotor halves together.
8. File to remove broach shoulder.	8. Rough and finish turn OD.
9. Finish turn OD.	9. Burr.
10. Burr.	

material and the filler rod had fused. This would inevitably chip or dull the tool. In order to obtain a smooth exterior finish, the finishing tool had to be reground after every pass. In fact, at times the tool would be so badly nicked after having passed through these hardened fusion zones that the second half of the rotor would show a very rough finish. This was de-



WELDED ROTOR prior to machining.

spite the fact that the speed and feed were reduced to about half normal values for the type and size of material being cut.

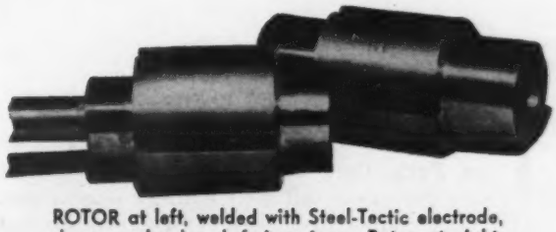
Special Electrode Adopted

For this welding job, Foster adopted Steel-Tectic, a low-amperage welding electrode made by the Eutectic Welding Alloys Corp. This electrode produced no hardened fusion zone. Tests showed only normal dulling of the tool, and good surface finish over the entire part. This was at the reduced speed and feed. At normal speed and feeds, test results were equally satisfactory.

The accompanying box compares the old and new production methods. At first glance, savings realized are not apparent, since the number of steps is about the same for both methods. But closer comparison reveals several points where savings are being made. For example in the third step, the hole undercut is eliminated. And, the sixth step of the old method included milling four slots individually, plus the broaching previously mentioned. With the new method, two slots are through-milled at once, with no broaching necessary.

Blocks Protect Slots in Welding

In production, each half has a radius turned at the edge where welding will be done, so that when the halves are joined a groove is left for depositing the weld material. For welding, the halves are mounted on a spindle which can be passed through the hole. As shown in Fig. 1, the spindle has a moveable tapered part at one end which can be pushed toward the other end by a nut, drawing up the rotor halves between the two tapers. Carbon blocks are inserted in the slots during welding to maintain alignment



ROTOR at left, welded with Steel-Tectic electrode, shows no hardened fusion rings. Rotor at right, welded with conventional high-heat rod, does. Both rotors have been finish-turned.

and to prevent slag and spatter from entering the slots.

The method is so new at Foster that accurate time study records have not yet been accumulated. But there is no doubt that the simplification of machining much more than balances the cost of welding the halves together. And, higher feeds and speeds in turning save time and labor. The adoption of the Steel-Tectic electrode has greatly reduced tool grinding and replacement costs. Overall, Foster's shop superintendent estimates production costs with the new method are less than two-thirds of the former method costs.

Multiply Spring Life Without Changing Design

By **CLYDE W. OICLES,** Superintendent, Web Wilson Oil Tools, Inc., Huntington Park, Cal. and **FRED K. LANDECKER,** Manager, Metal Improvement Co., Los Angeles

Eleven times more fatigue resistance has been imparted to the springs in the Web Wilson oil drill pipe tong. To do it, a different spring steel, a change in heat treating methods and the adoption of stress peening was required.

IN 1939, Web Wilson Oil Tools, Inc., Huntington Park, Cal., designed a new drill pipe tong for use in oil well drilling operations. This tong incorporated two "C"-shaped springs for the purpose of maintaining the tong latch in a closed position. The design of the latch springs was, at that time, considered adequate and desirable. It helped to simplify the manufacture of the spring, the latch and other component parts. Also, the springs were easy to replace in the event of failure.

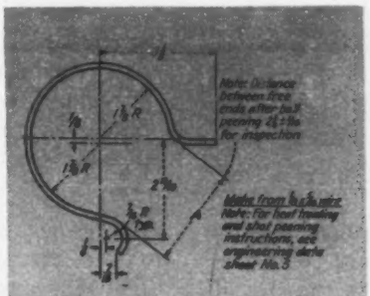
It was not until a good many tongs were in the field that it was realized that excessive latch spring breakage was occurring. By the time that this fact became established, it was too late to make a design change in the spring itself, because of the restricted amount of room available in which to place the spring. Neither could the mating parts of the tong be changed, since interchangeability is a very important factor in the design and manufacture of these units. Replacement parts going out into the field must fit the old tongs regardless of the date of manufacture. Since a design change was not possible, the only other alternative was to use every possible means to improve the quality of the spring.

The springs are made of ⅛ x 5/16-in. material, cold formed into the "C"-shaped spring. Before experimenting with various materials, heat treatments and other possible solutions, a machine was constructed on which a cycle test to destruction could be made of the springs. A counter mechanism was attached to the machine in such a way that the number of cycles necessary to run the spring to destruction was recorded. The counter mechanism was attached to the spring in a manner which automatically cut off the counter when the spring failed, regardless of whether the machine was turned off at that time or not. The machine was built by using actual tong parts and driving the

THE WEB WILSON pipe tong is used in oil field drilling operations. Life of the two "C"-shaped springs which maintain the tong in closed position has been extended so that they are good for many years of oil field service.

latch by means of an electric motor through a linkage mechanism, thereby simulating field conditions to a maximum degree.

In order to eliminate variations in individual springs as much as possible, a group of five springs picked at random from a given lot of production or test springs was used for each test made.



THE MATERIAL from which this oil tool spring is made was changed from SAE 1095 spring steel to SAE 6150. It is fabricated from 1/8 x 5/16-in. wire.

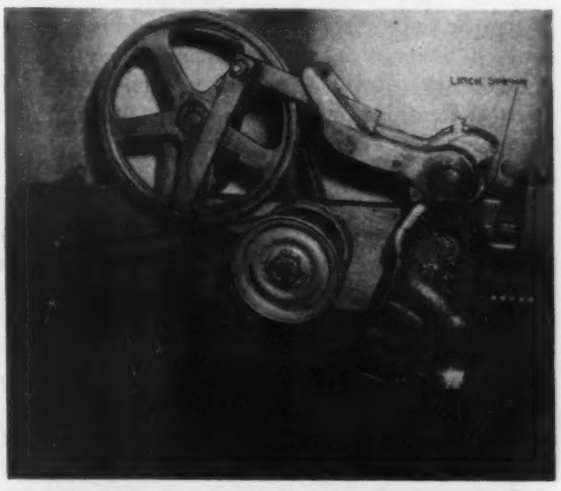
The first phase of the investigation concerned the type of steel used for the manufacture of the springs. Springs made of SAE 1095 spring steel wire failed at an average of 1700 cycles when tested in the machine. The second set of springs tested was made of SAE 6150 steel and these failed at an average of 5500 cycles. Based on these results, it was decided to use the SAE 6150 steel in all further tests.

The second series of tests involved various types of heat treatment. Heat treating in an open fire furnace was tried first. It was found that a hardness range of from 46 to 48 RC increased the average life from 5500 cycles to 6500 cycles. Further experimenting with heat treating involved the process of "Martempering" in a salt bath. This heat treating process was tried in order to eliminate what appeared to be decarburization of the surface of the spring in the open fire furnace. The Martempering heat treating process again increased the average life of the springs, this time to 7200 cycles.

An examination of all of the failures up to this point indicated they had started on the outside surface of the "C"-shaped spring. This was to be expected, since when the spring is stressed the outside surface is in tension while the inside surface is in compression. Since the failure of the spring appeared to start on the tension side, the next consideration was to try to increase strength by inducing a residual compressive stress at the surface. The shot-peening process was given consideration at this point and several test batches of springs were made by using different shot-peening methods.

The third phase of the tests, therefore, involved the shot-peening process, holding the heat treating and the material of the spring constant for these tests. The first batch of springs that were shot peened were peened on the outer surface of the spring. The springs were peened with P-28 shot (0.028 in. nominal diameter) to an intensity of 0.012 to 0.016 A-2. This specification indicates the curvature of an Almen "A" standard steel strip measured on an Almen specimen gauge No. 2, after it has gone through the same cycle of operations as the springs. This increased the average life of the springs to 12,500 cycles, an improvement of considerable magnitude.

An inspection of the fractures in these springs which had been shot-peened on the outer surface only, indicated that the fractures were now starting on the inside surface. As mentioned before, this is the compression side of the spring when it is under full load. The only conclusion that could be drawn here was that the spring was apparently failing as a result of the rapid release of tension in the testing cycle. It was also due to the fact that the shot-peened



ACTUAL PARTS of the oil field tong itself were used in constructing this fatigue testing machine, on which cycle tests to destruction were made of this tool's closure springs.

outer surface was protected by a high residual compressive stress, thereby forcing the failure to start at the next weaker surface, the inner surface. This inner surface is in tension momentarily when the tong latch is allowed to return to its closed position.

Based on this observation, the next batch of

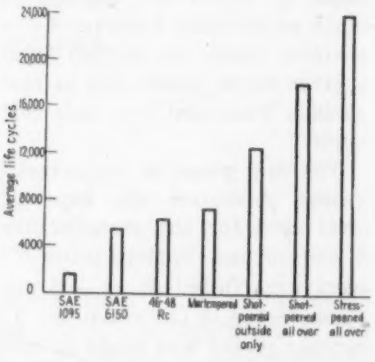
FOUR OF THE "O"-shaped springs whose fatigue life was raised from 1700 to more than 20,000 cycles are shown in the special fixture used to stress peen them.

experimental springs was shot-peened on both the outside and the inside surfaces. This resulted in a still further increase in the life of the springs. An examination of the fractures of these springs showed that the cracks were now starting on either the top or the bottom sides of the springs, despite the fact that the stresses in these narrow edges were much lower than in the wider inside and outside surfaces. It was concluded that the failures were commencing at the sides relatively close to the neutral axis, because of the fact that these were the only surfaces which had not been improved by shot-peening. The next batches of springs, therefore, were shot-peened on the inside, the outside and on the edges. The average life of these springs was in excess of 18,000 cycles.

The average life of the springs developed thus far was over ten times the life of the original springs which had been placed into production and had been sold to the customer. From the standpoint of sales, however, it was still found desirable to increase the life of these springs still further. The SAE 6150 spring steel was the best obtainable commercially, in the opinion of the metallurgists and heat treaters consulted on this problem. The heat treatment method being used was also the best obtainable. Therefore, it was agreed that "stress peening" was probably the way to achieve still better results. It had been shown[1] that a further increase in fatigue life could be obtained by shot peening a spring under static stress, in the same direction that it is stressed in actual service. A series of tests were therefore devised in which the springs were shot-peened under stresses varying from 0 to 100 pct of stress. It was found that compressing the springs to 45 pct of their total deflection while being shot peened brought about the optimum results. Stressing the spring below 45 pct of its maximum deflection gave improved results over no stressing at all and stresses beyond 45 pct caused excessive deformation in the spring by reason of the shot-peening operation and also decreased the ultimate fatigue life. Stress peening at 45 pct of the total deflection of the spring resulted in an average fatigue life of 24,000 cycles. This was considered to be satisfactory for field service, inasmuch as a life cycle of 24,000 would be equivalent to many years of actual oil field use.

At the conclusion of these tests, a process specification was written covering the entire procedure for manufacturing and testing these springs. The specification incorporates the processes found to be advantageous during these tests. The Metal Improvement Co. of

Chart showing life cycles of spring for different processes applied.



Los Angeles who had done all the shot-peening for these tests built a special fixture to stress-peen these springs in production. It is necessary to stress all the production springs to the same distance, rotate the springs and peen all surface evenly to an intensity of 0.012 to 0.016 A-2. The process specification as written requires a minimum of 20,000 average cycles for acceptance of a production lot. It is interesting to note that the inspection samples taken from production lots which have been manufactured since the process was inaugurated have given a slightly higher average life than the minimum requirement. They have also provided more uniformity than the experimental samples used as a basis for the writing of the specification.

[1] See *"Stress Peening,"* by John C. Straub and Don May, Jr., THE IRON AGE, April 21, 1949, p. 66.

Are You Getting the Most Out of Your Drill Presses?

Part II

By JOHN E. HYLER
John E. Hyler and Associates,
Peoria, Ill.

Drill presses can, with special attachments, be made to perform a variety of work other than drilling. Milling, grinding, and honing, are examples. Components of drill presses, combined with each other or with other equipment, have been used to make special production machines at relatively low cost.

USE of very small drills at high speed is often a feature of importance at the drill press. Too often the speed available is too low to allow efficient operation. Special drill speeders, having a shank that may be directly chucked at the drill press, are in use. In one minute, using such a speeder, any standard drill press may be converted into a high-speed production drill. Some drill speeders supply their own power. Fitted with a No. 0 Jacobs chuck, they have speeds up to 17,000 rpm, and accommodate drills from ⅛ in. down to No. 80.

One attachment which can be mounted in the drill press has a very high speed, running at 45,000 rpm. This is an ideal rotary speed for running carbide micro-mills. In addition to milling materials including hardest steel, the device is used for grinding, drilling, finishing and polishing when required.

Even this is not the ultimate in rotary speed on tools applicable to the drill press, however. Air turbine motors provide even greater speeds. Small grinders powered by air turbine sometimes run 35,000, 50,000 and even 75,000 rpm. Some of these are utilized as hole grinders, in various instances being used with a drill press for the purpose.

Many shops boost production by equipping a drill press with one of the various multiple-spindle drill heads available. In some instances it may be a two-spindle head, for there are many cases where a pair of holes is to be drilled and nothing more elaborate is required. Others use a drill head incorporating universal-joint spindle for proper adjustment, which fits any drill press. These usually allow drilling a maximum of 8 holes to any desired hole pattern.

There are also multiple drilling and tapping heads applicable to the drill press. Some of these have a capacity of from 2 to 10 spindles, and others from 2 to 12 spindles. Some are particularly engineered to cover drilling and tapping requirements on a specific standard part. Others have their spindles adjustable to an infinite variety of hole patterns.

It is well-known that many different tapping heads are applicable to the drill press for tapping one hole at a time, but it may be news to many that leadscrew tapping can be performed on drill presses with certain tapping heads available. One tapping head observed converts a drill press to a leadscrew tapping machine in a matter of minutes. It allows consistent tapping of Class 3 threads in the 0-80 to ⅞ in. range. Positive and automatic control of lead is obtained with a completely automatic cycle, though there is an instantaneous emergency reverse which may be used at any time. A foot control is used in connection, leaving the hands of the operator free for loading the work.

As drilling and tapping are related to one another, so stud setting is related to both. Self-opening stud setters are highly effective in connection with the drill press. Entirely automatic in action, some of these tools make a drill press effective as a follow-through machine on suc-

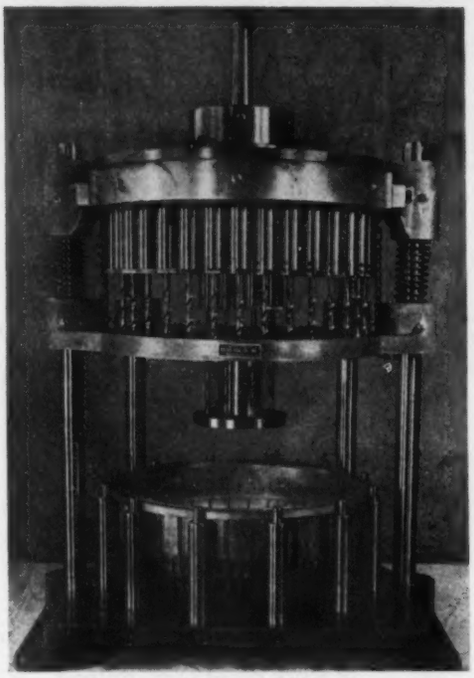
cessive operations of drilling, tapping and stud setting.

Drill presses designed with tubular columns, with a motor and drill head supported at the top, are light in weight, readily portable, and therefore capable of being moved about to adjust for changes in the production line. Further, such drill presses or their components have often been used in connection with other machines. One instance is where drill presses of this lightweight type are used as component parts of a crankshaft balancing machine. The overall arrangement makes it possible both to locate unbalance in the form of excessive weight radially, and to compensate for it by drilling out a sufficient amount of metal to neutralize the overweight. Light drill presses are also often set up in a battery, side by side, to form a composite multiple-spindle machine for complex production operations on light work.

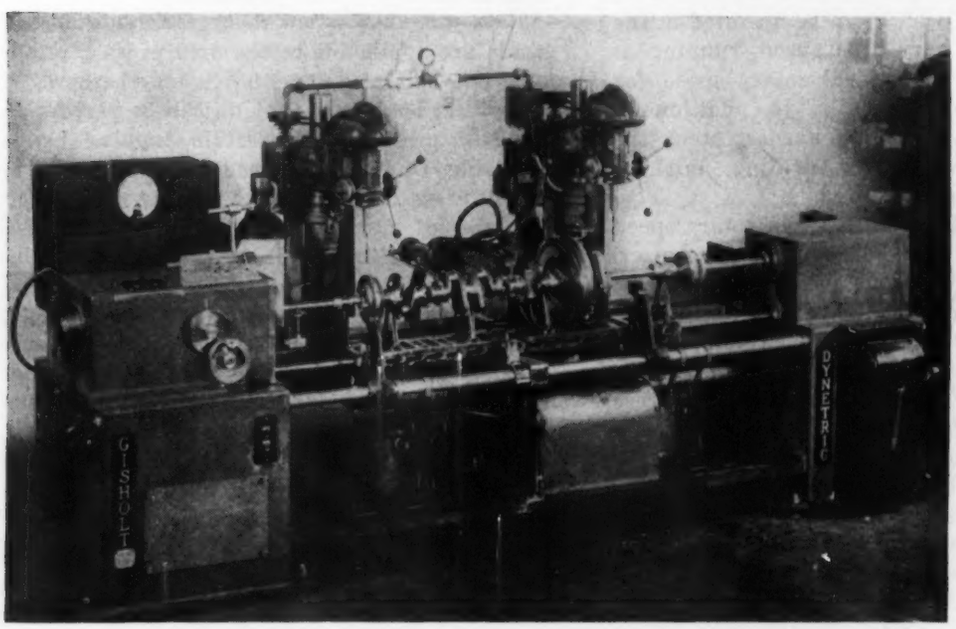
A number of light drill presses have been radially disposed and equally spaced around an indexing table. The table is then controlled for automatic indexing and dwelling. Parts may be turned from station to station and drilled, reamed, tapped, and the drilled hole otherwise machined all in the same operation, automatically. One or more drilling heads from such light drill presses have occasionally been mounted on the table of a large multiple-spindle drill. An actuating mechanism has then been designed and incorporated for these auxiliary drill press heads, which causes them to drill holes in the ends of workpieces, or at other angles than holes drilled by the main machine.

Light drill press heads have sometimes been pendantly mounted on overhead I-beams, and arranged to travel on those beams over the tops of large-area drilling tables, or over special jigs supporting workpieces. This lateral travel of drill press heads on the I-beams, in addition to the area which can be covered by radial swing provided on the heads, allows a very wide drilling scope to be covered by each head.

There are other drill-swinging aspects of some of these light drill presses. There is at least one drill press of light type for which an auxiliary radial arm is available. This arm does not make the machine a radial drill in the full



ELABORATE multiple-spindle drill head was built for use with a standard drill press. It drills 42 holes in an aluminum impeller cover. The part nests in the bottom of the fixture as shown. As the operator lowers the drill press spindle, the pressure pad bushing plate holds the part securely in place.



DRILL PRESS units added to this balancing machine make it possible to drill balancing holes without removing the part being balanced. An automatic welder is also provided for when weight is to be added.

sense, but it greatly increases the distance between the drill chuck and the drill column, making it possible to drill to the center of a piece of much greater area, and to any point on that area.

It is possible to take a number of light drill press heads and arrange them in radial formation in such manner that all drill points will be trained toward the same center point, and then to arrange an interconnected actuating mechanism which will cause all drill spindles to feed inward at the same time. Something of this kind has been done, for instance, in drilling radial holes in bearing races, putting such work on a real production basis.

One interesting development increasingly applied to drill presses is the pneumatic drill feed. Such feeds usually consist basically of an air cylinder operating off the shop air line. Some

AUTOMATIC FEED enables this drill press to drill four holes in brass valves at a rate of 9 pieces per min. The cam-operated rack revolves a pinion on the drill press spindle. A spring moves the rack back up.

earlier models were arranged with the air cylinder mounted above the end of the drill spindle. On certain more recent models, the air cylinder has an extension which clamps to the spindle quill at a point not far above the drill chuck. This more compact arrangement is such that an auxiliary air line is employed to automatically close an air clamp on the workpiece just before the air-fed drill engages. The feed speed of the cylinder is adjustable by means of an adjusting knob.

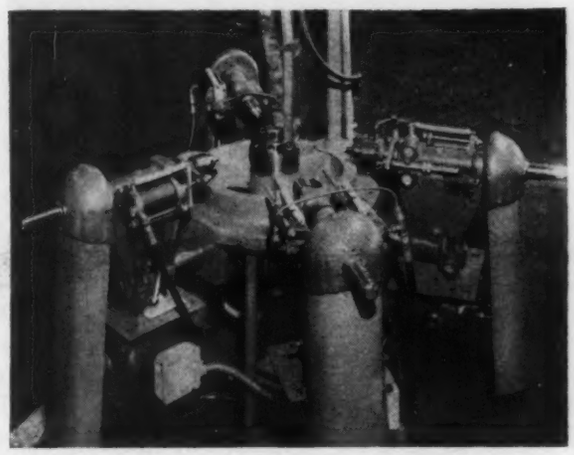
One air feed for use on drill presses is installed in such a manner that the air cylinder is back of the spindle at the right hand side of the machine. In this case, a drill press feed pinion is pinned to the star-wheel shaft, after the star wheel is removed. Thus the drill press receives its power feed from the same point of origin as with hand feed. The air cylinder piston, fully enclosed, is extended and terminates in a horizontally-traveling rack. This rack engages and actuates the pinion pinned to the star-wheel shaft. Air feed cylinders of this general type may be operated by means of a manually-actuated air valve or by an air valve which is solenoid operated, and therefore electrically controlled, for cyclical operation. An adjustable hydraulic resistance unit can be tied in with this air feed if desired. It may be used to provide rapid tool advance and to check it just before the tool enters the work, or it may be made to retard tool advance just prior to breakthrough. By special arrangement, it may be made to check tool advance at both points.

Head Has Own Feed

A recent development is a drill head which incorporates its own air feed through an inbuilt rotary-vane compressor. This unit has a maximum feed stroke of 1⅛ in., but its feed stroke may be adjusted from this maximum down to almost zero. It consists in the main of an electric motor with a double-end armature shaft. This shaft has a drill chuck on one end and a rotary-vane compressor on the other. The whole assembly is held in a cup-type housing, having a compression chamber at the bottom.

The rotary vane compressor draws air through a combined pressure regulator and intake filter, and passes it into the compression chamber. Resultant pressure building up in the chamber forces the entire motor assembly to move in the cup-type housing like a piston in a cylinder, thus advancing the drill. This advance motion is against the resistance of a compression spring, which automatically returns the motor assembly to retracted position when the air is exhausted from the chamber.

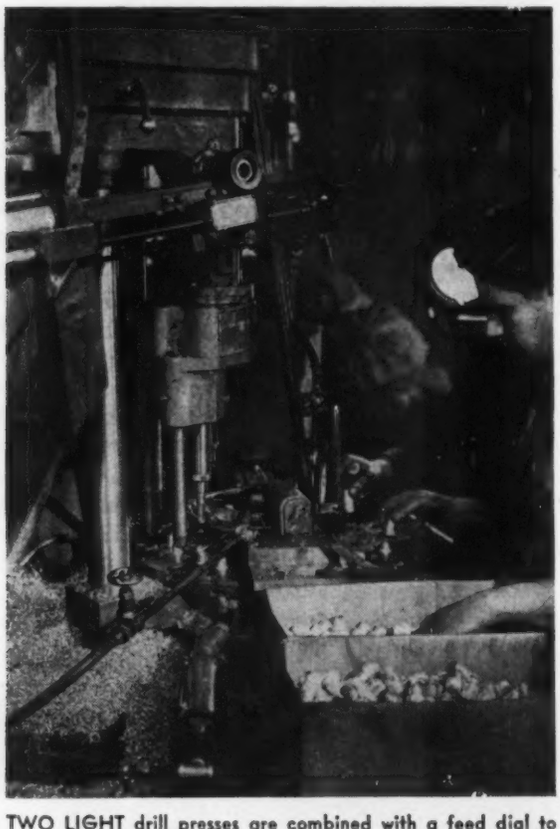
It is somewhat unusual to equip a drill press



PRODUCTION machine, home-made, incorporating four standard light drill press heads. An air-operated fixture positions the workpiece, and air cylinders advance the four spindles simultaneously.

with a three-jawed universal chuck provided with an air cylinder for its operation, as is so often done on lathes. This has nevertheless been done in various cases to very good advantage. In this case the combined air cylinder and chuck have their axis vertical, in line with the axis of the drill spindle. Layouts of this kind were much used during the war for performing various internal machining operations on relatively small, high-explosive shells. In any case where short pieces of shafting or other short cylindrical members are to be chucked in vertical-axis position for machining with a drill press, it is well to consider this method.

Collet indexing fixtures have a relatively wide range of application to light drill press work.



TWO LIGHT drill presses are combined with a feed dial to make a special production machine. Air cylinders index the dial, eject finished pieces, and feed the drill spindles. Operations are automatically sequenced by electrical controls. Former production was more than tripled, to 2600 pieces per hr, with this machine.

Some of these fixtures have a combination horizontal and vertical base. This means they can be clamped to a drill press table so the work-holding collet will have its axis vertical or horizontal, as need may appear. The indexing feature of the collet-type fixture has little or no significance on vertically held work in most instances, though there is an occasional exception. On horizontally held work, the indexing feature often finds definite application.

One interesting modification of the drill press is its application as an external honing machine. This has been made possible by recent development of an external honing tool. The tool used is light in weight, versatile, inexpensive, and it removes stock while holding an accurate size and generating a round and straight surface on the material involved.

Another class of special drill press tooling is applicable only when special table fixtures or other auxiliaries are used. One of considerable interest is the milling table, which may be mounted on the drill press table. When a small end mill is placed in the drill chuck, the drill press in effect becomes a small vertical miller.

One little-known mechanical device for use with the drill press is a belt-sanding unit. It carries an abrasive belt on edge for various types of sanding and grinding. A special pulley is fitted with a shank that can be held in the drill chuck, thus providing the necessary drive for the abrasive belt. The sanding and smoothing attachment proper is made with an aluminum base, a backing platen, and a driven pulley mounted on ball bearings. The aluminum base of the sander is bolted to the drill press table. Then, with the driving pulley mounted in the drill chuck, the attachment can be adjusted to bring sanding and grinding belts to proper working tension simply by swinging the drill press table around its supporting column.

Converted to Spring Maker

Facilities are now in use which convert the ordinary drill press into a spring-making unit. Equipment applied to the drill press for this purpose has a wire capacity from 8-gage to 28-gage, and different spindles are employed to govern the outside diameter of finished springs. The pitch of compression springs may be infinitely varied while the machine is in operation. Springs of all sizes are made at high speed, operating speed being limited only by temperature rise in the wire from fast working. The length of springs made is governed only by the length of wire available, and no particular skill or previous experience is required.

This article has not exhausted the possibilities of the drill press. It is hoped that what has been said, however, will be of value and will serve to stimulate further thinking relative to possibilities as yet unrealized, but latent in this ordinarily simple machine. Of course, no drill press should be adapted to service for which better equipment may logically be purchased and installed. But many cases exist where it is not practical to install more expensive equipment. In such cases, the drill press, with various attachments or modifications, often provides a solution.

news of industry

Shifting Gears for Quicker Defense Production

Economic controls coming thick and fast . . . So are higher taxes . . . Big cutbacks expected in some peacetime goods . . . Expect spurt in defense orders—*By Bill Packard.*

New York—From now on economic controls will be coming thick and fast. The changeover from peacetime economy to defense mobilization will move at a quicker pace. More price-wage controls are coming. More and more material restrictions are coming. And a controlled materials plan within a few months is a certainty. The same goes for excess profits and higher tax rates.

The changeover from peace to war goods will not be easy or painless. There will be serious economic disruptions. There will be some temporary unemployment. And some firms will lose vital skilled workers.

Big Cutbacks Expected

Some peacetime production will be especially hard hit. Heading this list are autos, houses, appliances, plumbing and hardware items, etc. These industries have already made some cutbacks. Bigger ones are still to come.

But these economic controls won't catch industry flat-footed. Seldom have they anticipated economic changes as accurately as they have since Korea. Hardly a cautious step toward mobilization has been taken but that industry had in advance urged an even bolder step.

This doesn't mean that controls are welcomed by industry or that they are painless when applied. It does mean that industry has a pretty clear picture of the danger we face. It is characteristic that it should want to deal with the problem at once—to rebuild our defenses before it is too late. That's why industrial leaders have been urging the government to start bold action quickly.

Faster the Better

From now on the faster the defense orders come the better it will be for industry. One of their most frequent complaints has been that there was too much time lag between restriction of materials for peacetime goods and the actual placing of defense orders.

So far defense orders placed have been far short of expectations.

A check of varied industrial firms this week shows that they expect government orders to spurt rapidly after the first of the year. This holds true for materials producers as well as manufacturers of finished products. They feel that the declaration of a national emergency will put the government on the spot so that it will have to place orders faster.

As defense orders increase, some drastic changes will have to be made quickly. There are too many frustrated manufacturers wildly waving DO orders requiring vital materials they cannot obtain.

Faster Defense Orders

New York—Aside from the psychological impetus the national emergency declaration will give defense mobilization, the biggest time saver will be in the letting of government contracts by negotiation.

Bids are at best a time-consuming process. The way is now cleared for a rapid speedup in defense contracts. Sources in industry also feel that the appointment of Charles E. Wilson as defense production chief heading the entire program will mean more orders and less red tape.

Acme to Expand Galvanizing

Chicago—Sales during 1950 will reach an all time high for the Acme Steel Co., according to Carl J. Sharp, president. Previous sales high was reached in 1948 when sales totalled $60 million. Mr. Sharp said the company will spend $1.5 million for the expansion of galvanizing facilities in anticipation of increased demand.

30 Million Tons of Ore Moved

Cleveland—Despite adverse weather conditions, Pittsburgh Steamship Co. moved 30 million gross tons of iron ore during the 1950 season, according to Walter C. Hemingway, president. This was 1½ million tons over the 1949 figure, a season shortened by the steel strike, but 2½ million tons under the 1948 post-war record tonnage.

INDUSTRIAL SHORTS

SAFETY RECORD — Claimed to be the all-time safety record in the entire American steel industry was reached by the Ellwood Works of NATIONAL TUBE CO., Ellwood City, Pa., by working 5,609,891 man-hr without a single lost-time accident.

CONSOLIDATION—Circo Products Corp., Cleveland, manufacturers of metal parts cleaning and degreasing machinery, has been purchased by the OPTIMUS EQUIPMENT CO., Matawan, N. J. Circo manufacturing operations will be moved to Matawan and will be known as the Circo Div. of Optimus.

NEW TITLE — The corporate name of Teuscher Pully & Belting Co., St. Louis, was changed to TE-CO, INC., since the company has gradually expanded its line to power transmission equipment, material handling equipment and industrial hose.

EXPORTERS — A new wholly owned company, ESB INTERNATIONAL CORP., New York, has been established to carry on the foreign business of the Electric Storage Battery Co. and its subsidiaries.

OPENS BRANCH —A branch office has been set up at 405-406 Thompson Bldg., Tulsa, Okla., by the LADISH CO., Cudahy, Wis. C. E. Mahoney, former Chicago district manager, will manage the new office.

SALES REP—Livingstone Engineering Co., Worcester, has appointed JOHN BAIZLEY CO., INC., Philadelphia, as district sales representative. Baizley will handle the sale of Speedylectric boilers and steam-jet cleaners in southeastern Pennsylvania, southern New Jersey, northern Delaware and northern Maryland.

CHANGES NAME—The B & M Mfg. Co., East Orange, N. J., has changed its name to HELICAL TUBE CORP.

SCRAP CHANGES — Louis Vineberg has been elected president of the GREATER DETROIT SCRAP TRADE ASSN. Other officers are: Samuel S. Schwartzberg, vice-president; Lewis Stern, second vice-president; Dave Siegal, financial secretary; Louis Wonboy, treasurer, and Marty Schulman, recording secretary.

IN BUSINESS — The H. M. SWITZER MFG. CO., INC., New Albany, Ind., has been organized. The company has acquired the manufacturing rights to a new type refillable liquid dispenser and an automatic electric clock refrigerator defroster.

MOVES UPTOWN — LURIA BROS. & CO., INC., has moved their New York offices from the Woolworth Bldg. to new enlarged quarters at 100 Park Ave.

STEEL AGENT — LEHARA SALES CORP., 485 Fifth Ave., New York, has acquired the agency for J. N. Eberle Co., Germany. They will import specialty steel strip, fabricated clock and technical springs, and saws of the smaller varieties.

NEW YORK BRANCH—A direct factory branch has been opened in New York by VEEDER-ROOT INC., Hartford. They are taking over the office formerly occupied by their distributor, J. T. Quinlan Co.

BUYS LAND — BLAW-KNOX CONSTRUCTION CO. has agreed to buy approximately 55,000 sq ft of land in downtown Pittsburgh for a site for the company's Chemical Plants Div.

Highway Truck Overloaders Curbed in Move by Defense Dept.

"Military necessity" excuse to be scrutinized by services and states.

Cleveland — Steps to prevent some truckers from claiming urgent military necessity as an excuse for violating weight laws have been taken by the Dept. of Defense.

Secretary of Defense, Gen. George S. Marshall, announced in Washington that letters have been sent to the governors of all the states seeking a means of cooperating with them in dealing with overweight truck movements.

A similar letter has also been sent to the president of the Board of Commissioners of the District of Columbia.

Claim "Military Necessity"

"The increasing movement of defense cargoes by highway has resulted in report to the Dept. of Defense of instances of truckers claiming urgent military necessity as an excuse for violating weight and size restrictions imposed on highway movement," the Dept. of Defense stated.

The Dept. of Defense proposes that each governor authorize one official to grant permits when requested by military representatives to meet military needs.

Under no circumstances will carriers be authorized to represent the military services in seeking such permits.

The Dept. of the Army will be responsible for establishing initial relations with state representatives. Thereafter, representatives of military departments will work directly with state officials to arrange clearance for important defense highway shipments.

R. M. Butler Named to NRAB

Cleveland—Raymond M. Butler, supervisor of Erie R.R. wage bureau since 1936, has been named by the Eastern Railroad committee to serve on the third division of the National Railroad Adjustment Board in Chicago.

Low Canadian Steel Supply Plagues Consumers and Officials

Holding urges 1 million ton boost in production; cites 1950 record.

Toronto—Canada's steel supply, steadily becoming more critical, is worrying consumers and government officials. While arrangements for United States steel will care for most of Canada's defense needs, little additional assistance is expected from Great Britain or Europe.

1 Million Ton Boost Needed

Canadian steel producers are doing their utmost to fill the gaps, but with little success. Production for 1950 points to a new all time record. Mills will have a big carryover of unfilled orders in 1951 and consumers are on a stiff quota basis for first quarter. No control action has been taken by the government.

Reviewing the Canadian steel situation, W. F. Holding, head of the Canadian Mfrs. Assn., said Canada's steel production should be boosted 1 million tons a year. Canada has the materials and demand. Total steel production this year will be about 3,300,000 tons, and imports will run about 1,400,000 tons, he stated.

The Steel Co. of Canada Ltd., and Dominion Foundries and Steel Ltd., announced plans earlier this year for new installations involving blast openhearth furnaces. These units will not be completed until late 1951 or 1952. Algoma Steel Corp. Ltd. has announced it will extend and modernize existing facilities. In the past year the company spent $1,421,267 on additions and improvements in plant equipment.

Feel U. S. Buying

Recently returned from Europe where he was unsuccessful in locating steel for Canadian manufacturers, Mr. Holding said U. S. buying on the Continent has been felt by United Kingdom mills which normally obtain slab and sheet steel from the Continent.

Mr. Holding suggested Canada follow the British lead in encouraging fabrication of raw materials at home. He said "a large stainless steel manufacturer in this country is able to obtain only half the nickel he needs while Canada is by far the largest producer of nickel in the world."

A shortage of steel furniture, cabinets, stoves and kitchen utensils next year was predicted.

More Price-Wage Controls Being Readied

Washington—Now that price increases on autos announced by General Motors, Ford, and Chrysler have been checked, the government moved closer to price-wage controls on a broader scale this week by calling new conferences with officials of basic industries.

Price Administrator DiSalle conferred on Monday with members of the American Iron & Steel Institute, with members of the Institute of Scrap Iron & Steel on Tuesday, and with nonferrous scrap dealers, the National Assn. of Waste Material Dealers, on Wednesday. Pricing problems was the topic.

Simultaneously, Wage Administrator Ching on Wednesday was holding similar conferences with major automobile manufacturers and union officials on wage problems.

Scheduled to attend the latter meeting were representatives of Ford, General Motors, Chrysler, Studebaker, Kaiser-Frazer, Willys, Crosley, Hudson, Nash and Packard. Also asked to take part in the conference were Walter Reuther of the UAW and other top union leaders.

Rites Held for George Fiechter

Philadelphia—George Fiechter, 69, with the printing division of the Chilton Publishing Co. for the past 50 years, died on Thursday, Dec. 4. He was superintendent of the Chilton printing plant, this city. Funeral services were held in Philadelphia last Friday and in Jersey City on Sunday. Mr. Fiechter lived in the Drexel Hill section of Philadelphia.

Erie R.R. Shows FCC Radio Setup

Cleveland — Operation of the Erie Railroad's four-way train radiotelephone network as a vital factor in safety and efficiency of railroad operation was demonstrated to members of the Federal Communications Commission this week. Commission members rode in an extra radio-equipped caboose where they could observe and participate in use of the radiotelephone.

Republic No. 5 Furnace Back In Blast After Full Relining Job

Cleveland—Republic Steel Corp.'s No. 5 blast furnace is back in operation here following the first complete relining since construction of the furnace in 1943. The furnace was taken out of blast on Oct. 4.

Hearth area of the furnace has been enlarged from 27 to 28 ft in diameter, equal to hearth area of the largest furnaces in existence. An additional 8000 tons of iron per year is expected.

A new 125,000 cu ft per min turbo blower will be in operation on the No. 5 furnace this spring, supplementing a second blower of 90,000 c.f.m. This will permit the furnace to again be blown at high top pressures of 10 lb and over and to produce in excess of 1400 tons per day. A government owned blower was removed in November 1948. The capacity of the furnace on a single blower was rated at 1275 tons per day.

Harvester Boosts Prices 4 Pct

Chicago—An average 4 pct price increase on farm equipment was announced recently by the International Harvester Co. Certain service parts were advanced 5 pct. Company officials gave the increase in labor and materials costs since Sept. 1 as the reason for the price raise.

Realistic Russia Resumes Chrome Ore Exports

Exports rise from nothing to 64,000 tons in third quarter 1950 . . . Reds know U. S. can get the ore elsewhere and reason they might as well make the dollars—*By Bill Czygan.*

New York—When the Russian freighter, Krasnador, hauled 6700 tons of steel-hardening chrome ore to Baltimore last July, Washington blinked its eyes and wondered what kind of trickery was in the shaping. The Iron Curtain had slammed down on chrome ore shipments and not a grain had leaked through from February. Now here was the admitted enemy of the U.S. conveniently unloading about 64,000 tons of ore in the third quarter alone—when international rifts were becoming unbridgeable.

Crazy Like a Fox

Realistic Russia is crazy like a fox. It slashed manganese ore shipments to nil this year but paradoxically resumed large chrome ore shipments. It was not an error in bookkeeping. The Reds logically reason that the U.S. must fight it out, sometimes unsuccessfully, in the free market for the limited world production of manganese. But since chrome ore is more easily available and the U.S. will pick it up with less trouble the Reds may just as well earn the American dollar.

They realize that their convenient chrome ore shipments will harden the steel of tanks and other armaments that may some day be flung against them but this does not make any difference. Realism at work.

No Shortage Blues

Russia was a major exporter of chrome ore to the U.S. In 1948 it shipped 400,000 tons. In 1949 trouble was brewing and it shut off shipments. About 107,131 tons managed to squeak through. January 1950 saw a sole shipment of 6300 tons get through and that apparently marked finis—until the third quarter when the Reds showed just how hard-headed they could be.

Chromium producers rank among the few who aren't crying the shortage blues. Chromite imports have been ample so far and supplies continue to exceed demand. Imports will probably total about 1,310,000 tons this year, as compared with 1,203,911 tons in 1949.

The Union of South Africa and Turkey were the largest exporters, whose combined shipments were a shade less than 60 pct of the total. Rising alloy steel production in the first 9 months of 1950 pushed chromite consumption to 703,946 tons, surpassing 1949's total use of 672,773 tons.

Metallurgical purposes, principally the manufacture of ferrochromium, took 50 pct; 37 pct went into refractories, and 13 pct into chromium chemicals. Expanded steel production has sharpened demand for chromium refractories. Since production of stainless steel is almost double that of last year—nearly 800,000 tons in '50 to 460,000 tons in '49—chromium has been a hot item.

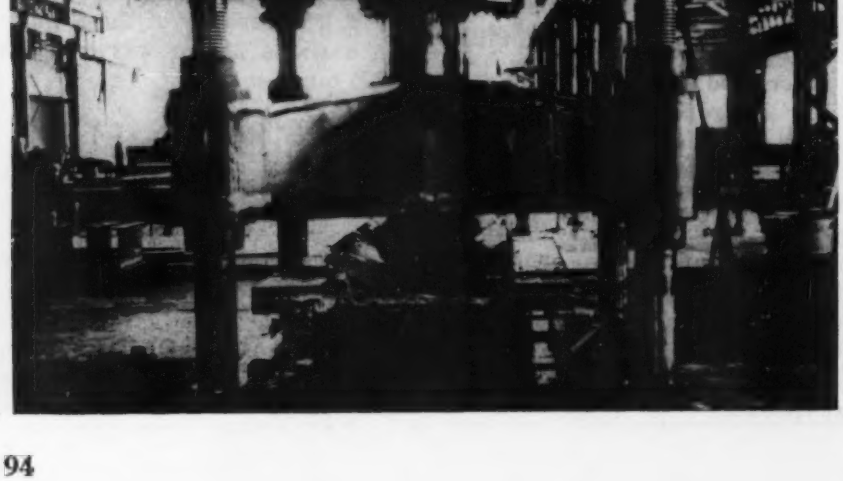
Boycott Russia

Although production of certain stainless steels containing chromium has fallen because of NPA cutbacks in nickel and columbium, straight chromium stainless output jumped.

Armor plate for our tanks will eat up a lot of chromium and when the defense program comes into full bloom demand for chrome ore will take a sharp upswing.

Some have suggested boycotting Russian chrome ore when we succeed in amplifying shipments from other producers—just as anxious to get American dollars. Either that or tell the Russians to sell us correspondingly large tonnages of critical manganese.

THE IRRESISTIBLE FORCE: Semi-circular piston sections for a large new hydraulic press are forced into shape at the Ingalls Iron Works Co., Birmingham, Ala. After being hot-pressed to an outside diameter of 32 in., the 4-in. plate sections were welded into complete cylinders.



Canada Opens New Power Plant

Trenche, Quebec — Canada's largest hydroelectric development, a $40 million generating station on the St. Maurice River, was completed this week. The plant, fifteenth in the system of the Shawinigan Water and Power Co., will be turning out 325,000 hp of electric power by next summer. The project was begun 2 years ago by Shawinigan Engineering Co., Ltd., a subsidiary of the power company.

Capacity for Steelmaking Rises in 1950

Rises by a minimum of 2.1 million tons . . . About 72 pct realized through work on existing facilities, balance from new furnaces . . . Finishing potential up—*By John Delaney.*

Pittsburgh—American steel producers increased their steelmaking capacity a minimum of 2,145,000 net tons during 1950, making total capacity at year end 101,537,800 tons, as compared with 99,392,800 at the close of 1949.

Approximately 72 pct, or 1,541,000 tons, of this new capacity was realized through enlargement, redesign, and modernization of existing equipment, and through technological advances, including use of oxygen. The balance of 604,000 tons represented new furnaces.

New Rolling Mills

Openhearth capacity was increased by 1,923,000 tons, of which 400,000 tons represented new installations, while electric furnace capacity grew by 222,000 tons, with new furnaces adding 204,000 tons.

At the same time, 17 companies increased finishing capacity through installation of new rolling mills or through modernization of existing equipment. Bulk of this new capacity was in flat-rolled. Companies affected were Allegheny Ludlum, Armco, Bethlehem, Columbia, Granite City, Jones & Laughlin, Kaiser, Republic, Sheffield, Thompson Wire, Thomas Steel, Washburn Wire, Wallace Barnes, Weirton, Youngstown Sheet & Tube, Midvale, and Northwestern Steel and Wire.

Armco Steel Growth

U. S. Steel Corp. subsidiaries added 800,000 tons of openhearth capacity during the year, 610,000 tons in the Pittsburgh district and the balance in the Chicago area. All of this was accomplished by enlarging furnaces, improving and altering existing facilities, adding new facilities, and rearranging equipment.

Armco Steel Corp. boosted capacity by 537,000 tons—519,000 openhearth and 18,000 electric furnace. Three new 250-ton openhearth furnaces at Middletown will yield 400,000 tons of new capacity, while modernization of openhearth furnaces at Ashland, Ky., and Houston, Tex., will add 47,000 tons and 72,000 tons, respectively, to the company's output. Modernization of electric furnaces at Butler and Middletown increased capacity at these plants by 6000 and 12,000, respectively.

Armco also added 24,000 tons to ironmaking capacity by modernizing a blast furnace at Ashland.

Following the Trend

Through technological improvements and rearrangements to accommodate larger cranes, Inland Steel Co. increased the productive capacity of 36 openhearths at its Indiana Harbor plant by 350,000 tons.

Technological improvements and increased use of hot metal enabled Wheeling Steel Corp. to boost openhearth capacity at Wheeling by 144,000 tons.

Bethlehem Steel Co.'s new 75-ton electric furnace at its Los Angeles plant added 132,000 tons to capacity there.

Through changes in design of 16 openhearth furnaces at Pueblo, Colo., Colorado Fuel & Iron Corp. increased capacity there by 48,000 tons annually. Redesign of four openhearths at the Buffalo plant added another 40,000 tons to capacity.

A new 60-ton furnace at its Brackenridge, Pa., plant gave Allegheny Ludlum Steel Corp. an increase in electric furnace capacity there of 72,000 tons.

Keystone Steel & Wire Co. boosted openhearth capacity at its Peoria, Ill., plant by 22,000 tons through a change in method of operation.

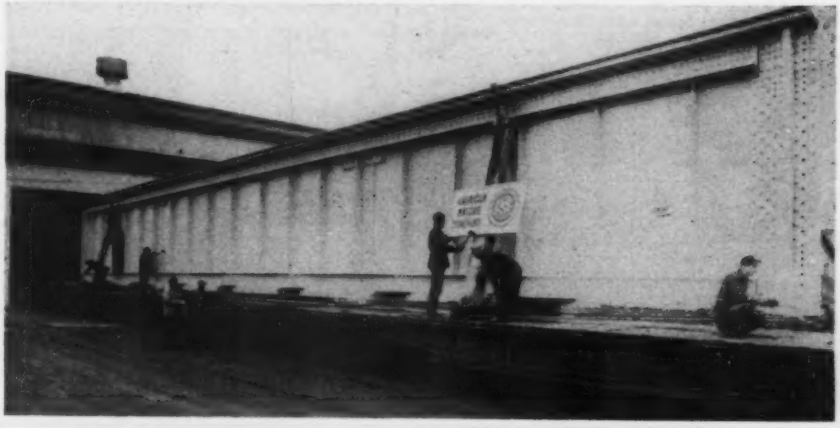
Hunt-Spiller Ring Orders High

Boston—Ring orders booked by Hunt-Spiller Mfg. Corp. in November set a new high for any month since March 1945, according to A. J. Edgar, vice-president. Ring bookings for 1950 topped the 1949 total by more than 50 pct.

Horwitz Heads N. Ohio ISIS

Cleveland—Joseph B. Horwitz was reelected president of the Northern Ohio chapter of the Institute of Scrap Iron & Steel, Inc., at a recent meeting. Jack Oettinger was reelected treasurer and Albert L. Friedman secretary.

STEEL MILL GIRDER: This 165-ton 110-foot girder fabricated at the Ambridge, Pa., plant of U. S. Steel's American Bridge Co., is one of 12 for the crane runway in J. & L.'s new openhearth shop under construction in Pittsburgh.



Great Lakes Steel Plans Blast Furnace; To Enlarge Openhearths

Detroit—Great Lakes Steel Corp., Ecorse, Mich., division of National Steel Corp., will build an additional blast furnace with an annual capacity of 480,000 tons per year and rebuild and enlarge eight of the present openhearth furnaces to 500 tons per heat.

The Great Lakes program is part of an expansion plan by National Steel Corp. which will bring in an additional 500,000 tons of steel capacity during the early months of 1952. When the expansion is completed National Steel Corp. capacity will be 5,200,000 tons annually, a spokesman said.

A contract to build the blast furnace on Zug Island has been awarded to Freyn Engineering Co., Chicago. When completed, the new furnace will require 1200 tons of coke, 2500 tons of ore and 500 tons of limestone daily.

The new furnace will be equipped with a top pressure five times that of the usual blast furnace. Through the use of special equalizer and relief valves designed by Freyn Engineering Co. the furnace will provide for normal operation of the charging bell despite the high top pressure.

George R. Fink, president of National Steel Corp., also disclosed plans to increase the capacity of the Zug Island coke plant.

Truck Assn. Elects C. B. Cook

Cleveland—C. Brenton Cook, vice-president, Elwell-Parker Electric Co., has been elected president of the Electrical Industrial Truck Assn. for 1951. Mr. Cook has been associated with Elwell-Parker since 1914.

Crucible Steel Expects to Add 300,000 Tons to Midland Capacity

Gets Certificate of Necessity covering $26,124,000 of project.

Pittsburgh—Once financial details have been worked out, Crucible Steel Co. will step up its expansion and improvement program to increase steelmaking capacity at its Midland plant by approximately 300,000 tons per year. Present capacity is around 1 million tons, latest figures show.

Rebuild 11 Openhearths

A Certificate of Necessity covering $26,124,000 of the cost of the program was issued last week by the National Security Resources Board. It will permit cost amortization over a 5-year period.

While all details have not been settled, the program calls for the

STEEL PRODUCTION (Ingots and Steel for Castings)

As Reported to the American Iron & Steel Institute

Period	OPEN HEARTH Net Tons	OPEN HEARTH Percent of Capacity	BESSEMER Net Tons	BESSEMER Percent of Capacity	ELECTRIC Net Tons	ELECTRIC Percent of Capacity	TOTAL Net Tons	TOTAL Percent of Capacity	Calculated Weekly Production (Net Tons)	Number of Weeks in Month
January, 1950	7,131,519	96.5	379,252	80.6	419,601	71.9	7,930,372	93.9	1,790,152	4.43
February	6,142,178	92.0	255,565	60.2	395,502	75.0	6,793,245	89.1	1,698,311	4.00
March	6,747,680	91.3	265,726	58.5	473,630	81.1	7,487,036	88.7	1,690,078	4.43
1st Quarter	20,021,377	93.3	900,543	65.9	1,288,733	76.0	22,210,653	90.6	1,727,111	12.86
April	7,314,733	102.2	407,909	89.5	490,030	86.7	8,212,672	100.4	1,914,376	4.29
May	7,597,837	102.8	437,006	92.9	517,044	88.6	8,551,887	101.3	1,930,449	4.43
June	7,218,570	100.9	406,944	89.3	506,001	89.5	8,131,515	99.4	1,895,458	4.29
2nd Quarter	22,131,140	102.0	1,251,859	90.6	1,513,075	88.2	24,896,074	100.4	1,913,611	13.01
1st 6 months	42,152,517	97.7	2,152,402	78.3	2,801,808	82.2	47,106,727	95.5	1,820,902	25.87
July	7,220,214	96.9	380,317	79.8	470,763	78.4	8,071,294	94.7	1,826,085	4.42
August	7,315,215	98.0	405,118	84.8	509,984	84.7	8,230,317	96.3	1,857,859	4.43
September	7,258,961	100.7	409,216	88.7	525,017	90.3	8,193,194	99.3	1,914,298	4.28
3rd Quarter	21,794,390	98.5	1,194,651	84.4	1,505,764	84.4	24,494,805	96.7	1,865,560	13.13
9 months	63,946,907	98.0	3,347,053	80.4	4,307,572	82.9	71,601,532	95.9	1,835,937	39.00
*October	7,731,280	103.6	436,835	91.5	571,980	95.0	8,740,095	102.3	1,972,933	4.43
†November	7,108,286	98.3	370,659	80.1	528,083	90.6	8,007,028	96.8	1,866,440	4.29
December	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.42
4th Quarter	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.14
2nd 6 months	.....	.....	.....	.....	.....	.....	.....	.....	.....	26.27
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,668,287 net tons open hearth, 106,195 net tons Bessemer and 131,786 net tons electric ingots and steel for castings, total, 1,906,268 net tons; based on annual capacities as of January 1, 1950, as follows: Open hearth 86,984,490 net tons, Bessemer 5,537,000 net tons, Electric 6,871,310 net tons, total 99,392,800 net tons. Beginning July 1, 1950, the percentages of capacity operated are calculated on weekly capacities of 1,685,059 net tons open hearth, 107,806 net tons Bessemer and 135,856 net tons electric ingots and steel for castings, total 1,928,721 net tons; based on annual capacities as of July 1, 1950, as follows: Open hearth 87,858,990 net tons, Bessemer 5,621,000 net tons, Electric 7,083,510 net tons, total 100,563,500 net tons.

* Revised.

† Preliminary figures, subject to revision.

January, 1949	7,289,865	101.2	408,552	92.6	498,973	96.1	8,197,390	100.4	1,850,427	4.43
February	6,635,765	102.0	379,698	95.3	478,479	102.0	7,493,942	101.6	1,873,485	4.00
March	7,476,139	103.7	430,176	97.5	495,481	95.4	8,401,796	102.9	1,896,568	4.43
1st Quarter	21,401,769	102.3	1,218,426	95.2	1,472,933	97.7	24,093,128	101.6	1,873,494	12.86
April	7,017,712	100.6	404,095	94.6	374,358	74.4	7,796,165	98.6	1,817,288	4.29
May	6,891,293	95.6	400,741	90.9	306,956	59.1	7,598,990	93.0	1,715,348	4.43
June	5,956,402	85.4	349,196	81.8	199,058	39.6	6,504,656	82.2	1,516,237	4.29
2nd Quarter	19,865,407	93.9	1,154,032	89.1	880,372	57.7	21,899,811	91.3	1,683,306	13.01
1st 6 months	41,267,176	98.1	2,372,458	91.2	2,353,305	77.6	45,992,939	96.4	1,777,848	25.87
July	5,309,060	73.8	300,236	68.2	175,535	33.9	5,784,831	71.0	1,308,785	4.42
August	6,103,326	84.7	355,335	80.6	264,110	50.9	6,722,771	82.3	1,517,556	4.43
September	5,994,100	86.1	350,282	82.2	253,553	50.5	6,597,935	83.6	1,541,574	4.28
3rd Quarter	17,406,486	81.5	1,005,853	76.9	693,198	45.0	19,105,537	78.9	1,455,106	13.13
9 months	58,673,662	92.5	3,378,311	87.0	3,046,503	66.6	65,098,476	90.5	1,669,192	39.00
October	814,618	11.3	.....	.....	113,729	21.9	928,347	11.4	209,559	4.43
November	3,806,870	54.6	172,270	40.3	243,989	48.5	4,223,129	53.4	984,412	4.29
December	6,953,653	96.7	396,075	90.0	378,496	73.0	7,728,224	94.8	1,748,467	4.42
4th Quarter	11,575,141	54.2	568,345	43.4	736,214	47.8	12,879,700	53.2	980,190	13.14
2nd 6 months	28,981,827	67.8	1,574,198	60.2	1,429,412	46.4	31,985,237	66.0	1,217,558	26.27
Total	70,248,803	82.8	3,946,656	76.0	3,782,717	61.9	77,978,176	81.1	1,495,554	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,626,717 net tons open hearth, 99,559 net tons Bessemer and 117,240 net tons electric ingots and steel for castings, total 1,843,516 net tons; based on annual capacities as of January 1, 1949 as follows: Open hearth 84,617,040 net tons, Bessemer 5,191,000 net tons, Electric 6,112,890 net tons, total 96,120,930 net tons.

rebuilding and enlarging of 11 openhearths and four of six electric furnaces; a 1000-ton-per-day blast furnace; the rebuilding and revamping of a bar mill, and 30 new coke ovens. Completion is scheduled within 18 months.

It is estimated that modernization of the openhearths will increase capacity by approximately 200,000 tons. Capacity of the four electric furnaces will be increased from 40 to 60 tons per heat, adding another 84,000 tons per year. Once the new blast furnace is operating, one of two existing smaller furnaces may be dismantled.

The program also calls for more cranes, ladles, and diesel-electric locomotives

Higher Freight Rates Mean Higher Steel Cost

Four pct rate hike asked by roads will add up to 40¢ a ton of finished steel . . . Jan. 1 action sought but ICC can't act that fast . . . Trucking rates also seen rising.

Pittsburgh—The 4 pct freight rate increase proposed by 179 Eastern railroads will add 25 to 40¢ to the cost of producing a ton of finished steel. This would include the 12¢ per ton rate increase proposed for bituminous and anthracite coal.

Steel consumers will pay between 35 and 50¢ per ton more to get the steel into their plants.

Takes a Little Longer

Although the Eastern roads asked that the increase be made effective Jan. 1, it was considered doubtful that the Interstate Commerce Commission could take action that quickly. The proposal is complicated by the roads' request that the ICC investigate the feasibility of extending the increase to other territories. Chicago, western and southern roads are not interested at this time.

If applied only in the East, the increase would affect shipments within, to, from and via Official Territory, which embraces an area east of the Mississippi and north of the Ohio and Potomac Rivers.

The railroads' petition mentioned increased cost only to Oct. 1, and does not include additional costs expected to result when current labor negotiations are completed. When the increase in wage costs is totaled up, the roads will come back with a supplemental petition to cover this.

Truck freight rates for iron and steel products will also go up, probably in the same proportion. A 4 pct increase in truck freight rates would narrow the gap that now exists between the special 80,000 lb carload rail rate, and the 32,000 lb truck rate. The truckers have been anxious to increase their rates, but did not want to widen the spread.

The Central States Motor Freight Bureau has already asked for a rate increase, scheduled to become effective Dec. 10, on 20,000 lb truck hauls of iron and steel products. This increase would bring the 20,000 lb truck rate up to the 40,000 lb rail rate. Haulers not affiliated with Central States are planning a similar increase to become effective in February.

DO Orders for Cadmium Metal Need Be Filled Only Up to 50 Pct

Washington — DO orders for cadmium metal, oxides and salts, need only be filled up to 50 pct of the amount of each order through Jan. 31, 1951, according to the National Production Authority. Where supplies do not permit filling orders to that extent, they are to be filled on a proportionate basis. The temporary directives sent to producers and prime distributors were necessary to prevent a complete shut-off of supplies for essential non-defense uses, since DO orders exceed the total available supply.

NPA has also told the Cadmium Industry Advisory Committee that a long-range program covering cadmium distribution would establish inventory controls and a specific list of permitted cadmium usage.

Steel, Power Production Records

Chicago — Steel and electric power production broke all former records during October in the Chicago area, according to Leverett Lyon, chief executive officer, Chicago Assn. of Commerce and Industry.

Steel output reached 1,571,000 ingot tons, 25,000 tons greater than the previous production record set in May of this year. Production of electric power, a good barometer of industrial activity, approximated 1.15 billion kw hr.

MAGNESIUM WHEEL FOR B-36: A 36-in. vertical turret lathe at the brake and wheel plant of the B. F. Goodrich Co., Troy, Ohio, in action trimming magnesium wheel for a Convair B-36 bomber.

GE's Wilson at Helm of War Output Drive

Greater production, more controls expected . . . Will put U. S. plants into war stride as industrialist takes charge . . . Wilson replaces Symington as key mobilization figure.

Washington—The Nation's mobilization program was spurred this week, with full-speed pace only awaiting adequate personnel to administer the growing list of necessary controls. Prime mover is former General Electric president Charles E. Wilson, now director of the Office of Defense Mobilization.

Wilson Replaces Symington

As head of ODM, Mr. Wilson has far greater powers than those held by the War Production Board of which the GE executive was vice-chairman. The presidential order gave ODM authority over all mobilization activities "including but not limited to production, procurement, manpower, stabilization and transport activties.

Possessing greater power than any official, excepting only the President, Mr. Wilson replaces National Security Resources Board chairman W. Stuart Symington as the key mobilization figure. NSRB will continue as the civilian mobilization planning agency, but is expected to lose its only operating authority—the granting of "certificates of necessity" for fast write-offs.

ESA into Action

For the present, the control set-up will remain the same. The Commerce Dept.'s National Production Authority will continue unchanged and the Interior and Agriculture Depts. and the Interstate Commerce Commission will retain their production and allocation powers, under ODM direction. In the cards, however, is a new production agency centralizing all these powers. In addition, a central manpower agency combining labor's Office of Defense Manpower, the U. S. Employment Service, and the Selective Service System, is in the talking stage.

While a speed-up of production control activities is a certain bet, even faster movement can be expected from the Economic Stabilization Agency. The auto price freeze will be followed by the establishment of "fair standards" for prices and wages for all industry. This is only a stop-gap measure until ESA can work out detailed price and wage regulations. Mandatory controls for the major ferrous and nonferrous metals as well as scrap are a good bet, and, pretty quick.

NPA's timetable calls for end-use limitations on tin, copper, cobalt, nickel, aluminum, and zinc as soon as regulations can be worked out and affected industries can be consulted. CMP is still scheduled for institution before mid-1951, and second quarter if possible.

Proclamation of the National Emergency by the President, which brought about the speed-up in mobilization activities, will permit the negotiation of any or all government contracts. It also brings into effect many minor powers. (THE IRON AGE, Dec. 14, p. 128).

Meanwhile, President Truman has asked Congress to restore titles I and II of the first war powers act. Title I would empower the President to transfer government agencies "in the interest of more efficient coordination of government." Title II would permit government agencies to make contracts and changes in contracts without regard to provisions of existing contract laws whenever the President deems—"such action facilitate the prosecution of the war."

Alloy Steel Plant at Owensboro

Pittsburgh—The Green River Steel Corp. will build an alloy steel plant at Owensboro, Ky., according to Sidney D. Williams, president. The plant will produce blooms, billets, and bars, at the start. More than $8 million will be invested in getting under way. A certificate of necessity covering 85 pct of the construction cost has been granted.

The plant will be situated on a 127-acre site at Owensboro between the Ohio River and the L. & N. Railroad. Power will be available from the Owensboro Municipal Utility Plant, natural gas from the Texas Gas Transportation Corp. Steel scrap will be brought in by barge from the south and southwest.

Convert Freighter to Ore Hauler

Cleveland—Cleveland-Cliffs Iron Co. has announced plans to put a new 619-ft iron ore carrier converted from a government Victory ship, in service by July 1, 1951. If negotiations for purchase of the freighter, now known as the Notre Dame Victory, are successful, it will be the fastest and most powerful ore vessel on the Great Lakes, with a speed of more than 18 mph loaded and 20 mph light.

This speed will give the ship a season capacity equal to that of the largest Cliffs vessels despite the fact that the carrying capacity of the Victory will be only 11,500 tons a trip compared with 14,850 for the larger carriers. It is believed that other vessel operators may also convert vessels of this type to obtain quick capacity.

Washer Sales Break All Records

Chicago—October factory sales of household washers broke all previous monthly records, according to the American Home Laundry Mfrs.' Assn. Totaling 439,924 units, sales surpassed the previous high of 433,419 set September, 1948. Sales of tumbler dryers totaled 28,882 units, down 8 pct from September and 83.3 pct higher than October, 1949.

European Steel Needs More Coal, Coke to Continue Growth

But output has not been up to the mark. U. K., West Germany lag.

London—Western Europe's growing steel industry will need larger tonnages of coal and coke which will not be forthcoming because of the slip up in production schedules, indicated the quarterly edition of the *Economic Bulletin for Europe.*

The Bulletin pointed out though that achievement of a unified market for European coal and steel industries would result in "freer and more active trade in the basic materials." The West German coal production slump below the limits decreed by the Ruhr authority is blamed for diminishing the expansion hopes of the European steel industry. A similar slowup in the British coal industry—to a point where Britain is importing American coking coal—has also done its bit to dash expansion hopes.

German Coke Costs

High cost coal production leads to more expensive pig iron for some European producers. German coke costs are considerably lower than France's and although offset by cheaper French scrap and iron ore result in cheaper German pig iron.

Other advantages of a unified market would come if coal output of the high cost areas of Belgium and France was replaced by accelerated Ruhr output and if French iron ore replaced high cost West German. (Germany also relies heavily on the high grade ores of Sweden.)

F. G. Davis Honored at Dinner

Detroit—Frank G. Davis, retiring general sales manager of Peninsular Steel Co. was honored at a dinner recently. Mr. Davis, a charter member of the Detroit Chapter, American Society for Metals, has been in the steel business here for 32 years. He is also a charter member of the Engineering Society of Detroit.

Manganese Ore Distribution Talks by Industry and Government

Washington—Representatives of manganese industry and Defense Minerals Administrator James Boyd are working together to find the most efficient means of distributing available supplies to permit continued high-level steel production and stockpile additions.

Industry representatives said the main problem is proper distribution of ore grades rather than the total tonnage of ore. Dislocations of world supply and stockpiling activities following World War II resulted in unbalanced stocks with some consumers, causing disruption of steel production schedules and sometimes inefficient utilization of available ore.

Check Incoming Supplies

The representatives agreed the most practical way to achieve equitable redistribution between companies would be to arrange a distributing system for incoming supplies rather than moving existing stocks from one plant to another. It was recommended stocks in the hands of any company should not be reduced below a minimum efficient working level consistent with the going steel production rate.

Connors Steel Plans Expansion

Pittsburgh—A $2 million expansion program for the Connors Steel Co. Div. of H. K. Porter Co., Inc., was announced by T. M. Evans, president of Porter.

Steelmaking capacity will be increased approximately 40 pct over the present rated capacity of 94,000 tons.

New facilities at the Birmingham, Ala., plant will include additional electric furnace capacity, a breakdown mill, a heating furnace and increased finishing capacity.

The National Security Resources Board has assured the company of the necessary material for prompt completion of the program. Warren W. Worthington, Pittsburgh steel consultant, will supervise engineering of the new facilities.

Iron Ore Rail Shipping Slows; Ore Pinch Seen for Next Spring

Pittsburgh—Cold weather and snow have slowed all-rail movements of iron ore to a trickle.

However, Carnegie-Illinois Steel Corp. has not given up for the winter. When conditions permit, the all-rail movement will be resumed. It is hoping for a break in the weather.

Pittsburgh Steel Co., which also had been shipping by rail, has discontinued for the winter. Most observers look for a real pinch in iron ore supplies come next spring.

For U. S. Steel Corp., the relatively poor lake shipping season will be offset by tonnage shipped all-rail, two reserve stockpiles in the Pittsburgh district that were accumulated during the 1948-49 shipping season, and new sintering plants that are utilizing ore fines currently being salvaged, as well as fines accumulated here over the years.

Ryerson Opens New Warehouse

Cincinnati—Joseph T. Ryerson & Son, Inc., steel distributors, have moved into their new steel service and office building in the heart of the Cincinnati industrial area. The new plant, which cost over $1 million, is located at 3475 Spring Grove Ave.

Floor space totals 165,000 sq ft. Complete facilities, including a 200 hp friction saw unit, have been installed for cutting and preparing steel.

A new electric eye controlled travograph flame cutting machine is also in operation. One part of the warehouse is heated to protect certain special types of bars and flat rolled steel while in stock. E. R. Nelson is plant manager.

Rosen Voted Scrap Unit Head

Minneapolis — Sol H. Rosen, president of the Union Scrap Iron & Metal Co., this city, and head of the Union Compressed Steel Co., Duluth, has been re-elected president of the Northwest Chapter, Institute of Scrap Iron & Steel.

Canadian Steel Output Rises

Toronto — Canadian production of primary iron and steel shapes for September 1950 totalled 367,515 net tons and compared with 365,125 tons in August and 280,857 tons in September 1949. September output included 355,867 tons of carbon steel shapes and 11,648 tons of alloy steel shapes. September production figures include 123,643 tons of shapes shipped for further processing.

Shipments for sale of primary iron and steel shapes in September amounted to 254,682 net tons; in August, shipments totalled 221,995 tons. September 1949 shipments amounted to 223,339 tons.

Coke Production Up Sharply

Washington — Anthracite and beehive coke production for 11 months of 1950 are well ahead of production for the same period in 1949, according to the United States Bureau of Mines. Anthracite production totaled 41,044,000 net tons, compared with 39,953,000 tons in 1949. Beehive coke production showed a 66 pct increase, with 5,012,700 tons output compared with 3,330,000 tons in 1949.

ACF Sets State Safety Record

Berwick, Pa.—American Car & Foundry Co. employees have received a special award from the Pennsylvania Dept. of Labor for establishing an all-time state safety record of more than 3 million man-hours worked without a lost-time accident. The award was presented to C. J. Hardy, ACF president, by Gov. James H. Duff.

GM Plans Long-Range Health Study

Detroit — A $1½ million research project to promote better health among its 446,000 employees has been announced by General Motors Corp. The new Institute of Industrial Health, conducted jointly with the University of Michigan, will undertake a long range program designed to reduce sick absenteeism and labor turnover.

STEEL

CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

1885 **Tons,** Newtown and Southbury, Conn., 4 span steel deck girder bridge, relocation U. S. Route 1 over Housatonic River to be known as Housatonic River Bridge. Mariani Construction Co., New Haven, Conn., low bidder.

1639 **Tons,** Caribou, Maine, steel bridge superstructure over Aroostook River. Completion date June 1, 1952.

320 **Tons,** Birmingham, Ala., addition for soaking pit through Amsler-Morton Construction Company, for Tennessee Coal, Iron & Railroad Company, to Virginia Bridge Company, Birmingham.

Fabricated steel inquiries this week included the following:

2290 **Tons,** The Dalles, Oregon, by County Clerk, Court House, The Dalles, Oregon, for construction bridge and approaches across Columbia River, near Covington Point, east of The Dalles, Wasco County, Oregon; bids to January 4, 1951.

348 **Tons,** Darien, Conn., grading and drainage and 3-span continuous rolled beam bridge, relocation U. S. Route 1 (bridge over New Haven R. R. tracks).

Reinforcing bar awards this week included the following:

1350 **Tons,** Chicago, Chippewa Apts., to Joseph T. Ryerson and Son, Chicago.

710 **Tons,** Chicago, Chicago Housing Authority No. 9, to Bethlehem Steel Co.

380 **Tons,** Chicago, Barry Ave. Apts., to Joseph T. Ryerson and Son.

350 **Tons,** Pittsburgh, Equitable Life Assurance Society, to Jones and Laughlin.

335 **Tons,** St. Paul, F. D. Roosevelt homes to U. S. Steel Supply Co.

215 **Tons,** Oak Park, Ill., Oak Park Hospital, to Ceco Steel Products Corp., Chicago.

170 **Tons,** Oak Park, Ill., St. Vincent's Church, to Olney J. Dean Co., Chicago.

125 **Tons,** Alliance, Ohio, Stanton High School, to U. S. Steel Supply Co.

105 **Tons,** Bismarck, N. D., high school, to Bethlehem Steel Corp.

100 **Tons,** Brookings, S. D., agricultural bldg., to Hassenstein Co.

Reinforcing bar inquiries this week included the following:

4000 **Tons,** Paducah, Ky., powerhouse.

1000 **Tons,** Evergreen Park, Ill., shopping center.

950 **Tons,** Allegheny County, Pa., LR 765 paving and bridges.

856½ **Tons,** Los Angeles, Calif., by Los Angeles Dist. Corps of Engineers, 751 S. Figueroa, Los Angeles, for Compton Creek Improvement, Lonzat-Main Sts., under Spec. ENG-51-9; bids to January 4, 1951.

650 **Tons,** Chicago, Racine Ave. pumping station, Exit L.

525 **Tons,** Westmoreland and Allegheny Counties, Pa., LR 765 paving and bridges.

394 **Tons,** Los Angeles, Calif., by Calif. Division of Highways, 120 S. Spring St., Los Angeles, for construction bridge under Hollywood Freeway, at Holly Drive, Los Angeles County, Los Angeles (VII-L.A.-2-L.A.); bids to January 11, 1951.

150 **Tons,** Cleveland, American Radiator and Standard Sanitary Corp.

149 **Tons,** Darien, Conn., grading and drainage and 3-span continuous rolled beam bridge, relocation U. S. Route 1 (bridge over New Haven R. R.).

130 **Tons,** Due Page County, Ill., Argonne National Laboratory Reactor Engineering Bldg.

Imagine the Disgrace

Ellwood City, Pa.—The first man who has a lost-time accident at the Ellwood Works of U. S. Steel's National Tube Co. probably will feel worse about the accident itself than any injury he might suffer.

Because as of Dec. 13 the Elwood Works' 3300 employees piled up the all-time safety record in the American steel industry—a record of 5,609,891 manhours worked without a lost-time accident.

Best previous record was the 5,598,376 manhours at the Pueblo, Colo., plant of Colorado Fuel and Iron Corp., according to National Safety Council records. Last lost-time accident at the Ellwood plant occurred when a falling piece of steel broke the toe of a worker last Jan. 29. He was off work 2 days.

Approve Study of Brazilian Ore

Washington—A 10-year minerals investigation program in Brazil now under way—the first step toward establishing a large-scale export of vitally-needed iron ore—has just been approved for continuance as a Point Four project.

The Interior Dept.'s Geological Survey is cooperating in this program by request of the Brazilian Government to determine the quantity and grade of iron ore and manganese deposits in the state of Minas Gerais.

Will Map Topography

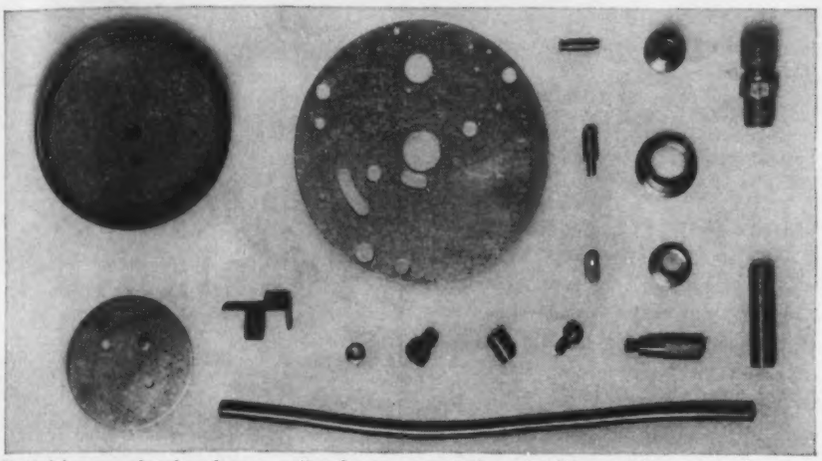
Under the Point Four program, investigation will be made of high grade iron ore and manganese deposits and the topography will be mapped extensively. While Brazil iron resources have long been known as among the largest in the world, precise data on distribution and grade have been lacking. Results of the current project will provide vitally-needed minerals for defense and other purposes.

The cooperative program was started in 1940 and in a 1948 agreement between Brazil and the U. S., its continuance was guaranteed until 1958.

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by BRIDGEPORT BRASS COMPANY "Bridgeport" Headquarters for BRASS, BRONZE and COPPER



Leaded brasses, phosphor, bronze, yellow brass, copper strip and tubing used in governor for trucks, automobiles and buses—Courtesy Speedmaster Corporation, Plainville, Conn.

Brass and Bronze Important in Vehicle Speed Governors

Controlling the speed of trucks, automobiles and buses for maximum efficiency and greater safety is accomplished through the use of automatic governors.

Brass, phosphor bronze and copper strip and tube play an important part in the Speed Master governor illustrated above.

When a predetermined speed is reached, the unit automatically takes over and controls the amount of gas being fed into the engine.

Copper Conductor Shell Used

Driven off the speedometer cable, a permanent magnet spins inside a copper shell which has a steel band around it. The copper acts as a conductor for the magnetic field. The faster the magnet revolves, the more pull or "drag" is put on the floating steel shell. This shell gradually rotates, moving a series of brass levers. When the speed to which the unit is set is reached, a switch is actuated by the levers and is closed. The current is then transmitted to the carburetor unit which automatically controls the flow of gasoline.

The non-magnetic properties of the copper-base alloys play an important part in the unit. At the same time fabrication is facilitated through the use of free machining brass rod for the screw machine parts and leaded clock brass for the levers and plates which are pierced and blanked.

Piercing Facilitated

Clock brass alloy 62 contains 2% lead. This lead causes the metal to pierce cleanly with a minimum of burr. Thin sections are possible since this metal is normally supplied in hard to extra hard tempers. Tensile strengths above 70,000 psi are reached. Machining operations are also simplified by the lead content. Good bearing surfaces are also characteristic of this alloy.

Springs on the terminals are of phosphor bronze Grade A (95% copper and 5% tin). The high fatigue resistance of this alloy permits many thousands of flexings without failure.

This same unit can be modified to shut off an idling motor at any specified time on such vehicles as delivery wagons. Copper wire, brass and phosphor bronze are also used in this mechanism.

Corrosion Resistance Important

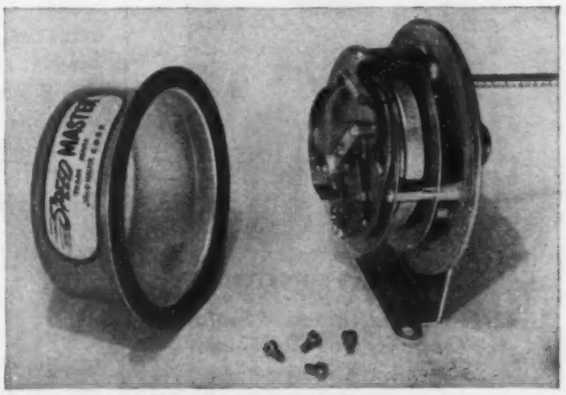
Although sealed with a rubber gasket, the conditions under which the unit operates can be conducive to corrosion of non-ferrous metals. The high corrosion resistance of the copper-base alloys also helps to insure long, trouble-free life.

High brass (65% copper and 35% zinc) is used for the mounting and assembly screws. The high ductility of this alloy lends itself to relatively easy cold heading and roll threading.

Standard Tooling Satisfactory

On the screw machine parts such as bushings and collars, free turning brass rod, hard temper (61% copper, 3.4% lead and remainder zinc) high speeds and heavy feeds are possible. The chip breaks cleanly due to the lead and high finishes are possible with standard tooling.

For information on copper-base alloys or for help in selecting the correct alloy for your product, Bridgeport's Laboratory is backed by years of experience and ready to be of service to you.



Actuating mechanism for Speed Master governor which controls speed of vehicles to a predetermined rate — Courtesy Speedmaster Corporation, Plainville, Conn.

publications

Continued from Page 38

struction of the machine are detailed, and the various loading methods are discussed. Applications are also shown, illustrating the universal application of the unit. *Hoern & Dilts, Inc.*

For free copy insert No. 11 on postcard, p. 39.

General Contractor

Conveying an idea of the scope and flexibility of Eichleay service, a 32-p. booklet presents a picture record of some of the many projects handled, and emphasizes the ability of this company to handle unusual engineering problems. Projects shown include complete plant erection, structural steel erection, installation of industrial equipment, relocation of industrial units, foundations for buildings and equipment, and building moving, for a wide variety of industries. *Eichleay Corp.*

For free copy insert No. 12 on postcard, p. 39.

Ladle Stoppers

Electro stopper heads for open-hearth, steel foundry and electric furnace smelting are shown in a new 4-p. folder. Such features as economy, no spalling, abrasion resistance, high softening point and cold strength, great hot load-bearing capacity and dependability of these composition stoppers are detailed. Electro-Carb for steel deoxidation, as well as roll grinding wheels and snagging wheels are also described. *Electro Refractories & Alloys Corp.*

For free copy insert No. 13 on postcard, p. 39.

Versatile Presses

Cleveland Steelweld presses for plate of thicknesses to 1 in. and lengths to 20 ft are the subject of a new 8-p. catalog showing various models for bending, braking, punching, blanking, drawing and corrugating. Clearances, dimensions and specifications are listed, and special bed and ram designs are shown. A section of the booklet deals with different types of bending press dies. *Cleveland Crane & Engineering Co.*

For free copy insert No. 14 on postcard, p. 39.

Resume Your Reading on Page 39

"We get better finishes on gear teeth longer tool life with Gulf L. S. Cutting Base," says this foreman

"Since we switched to Gulf L. S. Cutting Base we've been able to make an overall improvement in gear production," says this foreman. "Tooth finish on both bronze and steel gears is much improved, tool life is considerably better and we've been able to step up the production rates on several machines. And Gulf L. S. Cutting Base seems just right for every job in the gear room."

A typical report from the scores of plants which have made some improvement in machining practice through the use of Gulf L. S. Cutting Base, the outstanding multi-purpose cutting fluid.

Call in a Gulf Lubrication Engineer today and let him help you find opportunities for greater production at lower cost through the use of one or more of the quality cutting oils in Gulf's complete line. Write, wire, or phone your nearest Gulf office.

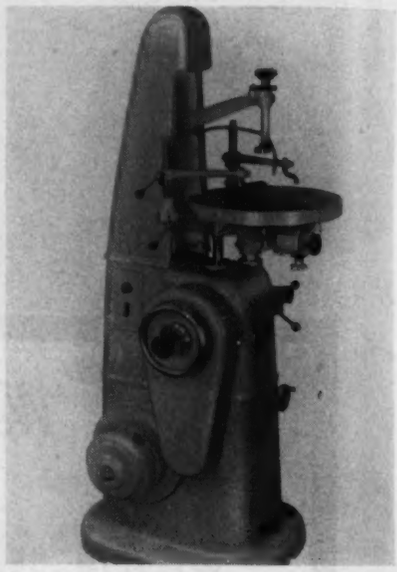
Gulf Oil Corporation · Gulf Refining Company
GULF BUILDING, PITTSBURGH, PA.
Sales Offices - Warehouses
Located in principal cities and towns throughout Gulf's marketing territory

GULF INDUSTRIAL LUBRICATION

production ideas

Continued from Page 42

motor of ½ hp 1800 rpm. The variable speed transmission is fully enclosed, operated from a dial and handle to provide 75 to 350 strokes per min of the operating shafts, suitable for all grades of steel. A new main drive mechanism uses a segment and gear control, and a throw out clutch to simplify the stroke adjustment. A splash lu-



bricating system insures quiet operation and a foot pedal gives instant control of operation. The machine retains such features as compound tilting table with vernier scale reading, 5-in. stroke and table adjustment, and heavy 17-in. diam counterbalanced table. *Connecticut Tool & Engineering Co.*

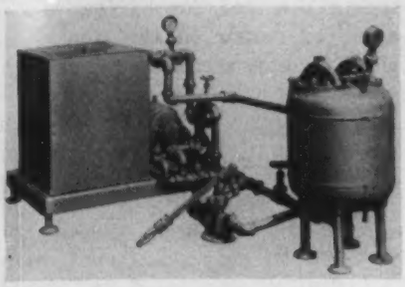
For more data insert No. 32 on postcard, p. 39.

Impregnating Equipment

For sealing parts and castings rejected because of porosity.

A new piece of impregnating equipment has been designed for the smaller foundries and manufacturers to solve "leaker" problems in small parts and castings. The process is said to be simple, effective and economical. The equipment is complete and requires no expensive plant alterations. No skill is required for operation. A part or casting once sealed is claimed to be pressure tight for the life of the part withstanding any

pressure temperature and chemical condition that the part was designed for. Ferrous and nonferrous metals may be sealed by the process, either before or after machining. The sealant is non-inflammable, non-toxic and non-injurious to the skin. No baking or curing process is required other than a 24-hr setting period. *Tincher Products Co.*



For more data insert No. 33 on postcard, p. 39.

Industrial Fluid Coolers

Control temperature of coolants.

Frostrode fluid coolers use an air-cooled refrigeration cycle in cooling the oil or other coolant flowing through the cooler. The flow circuit is designed to provide a maximum heat transfer with a minimum pressure drop or flow restriction. Coils are constructed of either steel or copper tubing. The coolers are built in standard models to handle most applications and in special models with explosion proof construction for hazardous fluids and locations. *Viking Products.*

For more data insert No. 34 on postcard, p. 39.

Battery-Operated Tractor

Valuable for small plants; hauls trailers in single, multiple loads.

The Load-Mobile tractor is 44 in. long and is adaptable to smaller

production ideas

Continued

plants where space is at a premium. It features 3-way operating position: the operator facing away from the load he is hauling; facing the load for narrow passages; or riding on the step provided for easy access on and off the

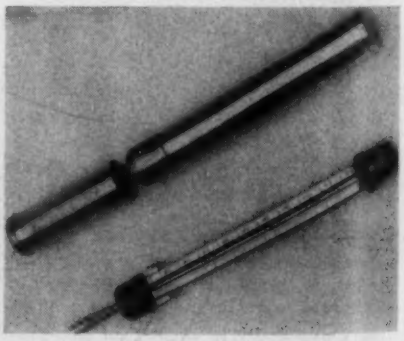
truck, especially for short hauls. The tractor can be furnished with automatic or manually operated tractor hitch. Models have 3000 and 5000 lb capacity; draw bar pull of 500 to 800 lb; no load speed, 3.5 to 4 mph; full load speed 2.5 to 3 mph. *Market Forge Co.*

For more data insert No. 35 on postcard, p. 39.

Hardness Tester

Pocket size for on-the-spot tests; based on the rebound principle.

The Sklerograf is placed vertically on top of the object to be tested and the rebounding bar released.



The bar with its hardened steel ball point of 3/16 in. hits the test object, rebounds and through a device in the head of the Sklerograf, is caught in a mathematically exact position. The hardness degree is indicated on the scale on the front of the instrument. *Kurt Orban Co.*

For more data insert No. 36 on postcard, p. 39.

Resume Your Reading on Page 43

IRON AGE *markets and prices*

market briefs and bulletins

ferroalloy prices—Increases in ferroalloy prices, effective Dec. 12, have been announced by Electro Metallurgical Div. of Union Carbide & Carbon Corp. All grades of low-carbon ferrochrome are up ¼¢, setting a new base price of 30.50¢ per lb for 0.06 pct carbon grade. Other prices are: Ferrosilicon, 50 pct, 12.40¢ per lb; 65 pct, 15.40¢ per lb; silicomanganese, all grades, 9.90¢ per lb for 1.50 pct carbon grade; silicon briquets, 6,95¢ per lb; silicomanganese briquets, 11.15¢ per lb; ferrotungsten, $3.25 per lb of contained tungsten. Tungsten powder has been increased to $4.15 per lb of powder.

steel in Birmingham—The steel situation here is getting tighter. Fabricators and warehousemen call the situation serious. One warehouseman claims certain items are becoming so scarce his company sees little reason for taking orders. T. C. I. president Robert Gregg says DO orders are cutting into supplies for civilian uses and further cuts are expected as defense orders are received.

extra changes—Cold-rolled sheet gage and width extra changes by Jones & Laughlin Steel Corp. include increases of 10¢ up to 48 in., 5¢ for 48 to 72 in., and reduction of as much as 30¢ for over 72 in. Extras for lengths over 36 in. were increased 5¢ to 30¢, while a reduction of 5¢ was effected in the 24 to 36 in. length bracket in 20 to 24 gage.

wrought iron bars, plates—A. M. Byers Co. has announced the following prices for wrought iron: single refined bars, $9.60; double refined bars, $11.90; staybolt bars, $12.20; plates, $8.60.

hot-wound springs—Due to higher operating and raw material costs, the American-Fort Pitt Spring Div. of H. K. Porter Co., Inc., has increased the price of heavy hot-wound springs approximately 10 pct.

price study—Price Administrator DiSalle has telegraphed steel firms asking complete price books showing base prices and extras. He wants their effective prices as of June 15, 1950 and as of Dec. 15, 1950.

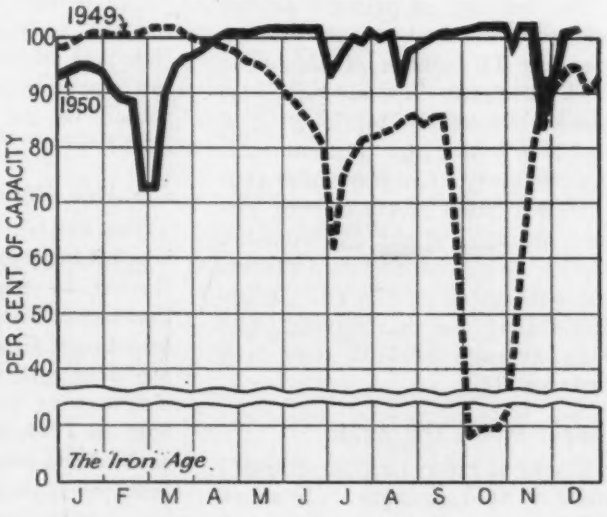
back to normal—Steel mills in the Chicago area are gradually getting back to normal production since the end of the rail strike Saturday night. However, in addition to the shutdowns at Carnegie's South Works, five blast furnaces were down at Carnegie's Gary Works last Thursday, cutting ingot production output by one third. This means that during the strike Carnegie shut down nine of 23 blast furnaces in operation before the strike.

silvery iron—Keokuk Electro Metals Co. has announced increases on spot prices for Keokuk electric furnace silvery iron, 14 to 20 pct silicon, of $3 a gross ton, effective immediately. The new price is $89.50.

nickel-alloys—The recent 2½¢ per lb increase in nickel will add about $5 per ton to the cost of type 4340 steel. Alloy producers, studying their costs, haven't indicated whether or not they will raise prices accordingly.

foundry coke—New England Coke Co. has announced a new price, $24.80 per net ton, for foundry oven coke at delivery point effective Dec. 15.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Dec. 10	21.52*	18.49*	9.85*	98.0	104.5	104.0	4.75*	106.0	101.0	104.0	67.0	90.5	103.5	100.0*
Dec. 17	101.0	105.0	80.5	98.0	101.4	104.0	100.5	103.0	104.0	106.0	92.5	90.5	116.0	101.0

* Revised.
** Steel operations for the first half of 1950 are based on annual capacity of 99,392,800 net tons. Beginning July 1, 1950, operations are based on new annual capacity of 100,563,500 net tons.

nonferrous metals

outlook and market activities

NONFERROUS METALS PRICES

	Dec. 13	Dec. 14	Dec. 15	Dec. 16	Dec. 18	Dec. 19
Copper, electro, Conn. ..	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake, delivered..	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York ...	$1.39	$1.42	$1.46	....	$1.47*	$1.47*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.

*Tentative.

by r. hatschek

New York—International Nickel Co. of Canada last week increased the price of nickel 2½¢ to 50½¢ per lb, including the U. S. import tariff. The last increase was an 8¢ boost last May 31 to 48¢ per lb.

At the same time, "A" Nickel and Monel mill prices were also increased 5¢ to 7¢ per lb. The increase was precipitated by a 6½¢ to 8¢ per hour wage increase in all of the company's Canadian plants.

The tonnage of primary copper produced in this country during the first 11 months of this year (854,530 tons) has already surpassed the yearly totals of 1948 and 1949 and a new postwar peak is a certainty. The November production totaled 82,442 tons of primary metal, a slight dip from the 82,750 tons produced in October, but well ahead of the daily average output for that month. The daily average of 2748 tons is a postwar high.

Copper Stocks Dip Again

Stocks of refined copper dropped another 5140 tons to a total of 51,805 tons. Refined production and deliveries were also slightly lower in November than the previous month but they were still high. Refined production was 101,410 tons and 113,715 tons were delivered to fabricators.

The government is now planning end-use restrictions on copper, zinc, aluminum, nickel and cobalt for non-essential civilian consumption. NPA is hoping to be able to provide a long enough lead-time between the issuance of the orders and the date they go into effect, thus enabling producers to retool and substitute other materials wherever possible. The producers, however, are asking for longer than the 3 months proposed by NPA.

The British Government is also reported to be planning the establishment of an allocation system for scarce materials. Zinc is expected to go under control on Jan. 1.

Can Meet Defense Needs

The British aluminum situation is a bit happier now with the conclusion of negotiations between that government and the Aluminum Co. of Canada. The Canadian producer will ship about 150,000 metric tons to the United Kingdom in 1951, as it has done for each of the past 3 years. The government is then planning on placing firm orders for 220,000 metric tons during 1952 and a like amount in 1953.

It is expected that this amount of aluminum will take care of Britain's military and essential civilian needs during those years but non-essential use of the metal is almost certain to suffer.

In the scrap trade, dealers' buying prices for soft scrap lead have been increased ½¢ to¾¢ to a high of 15¼¢ per lb and the metal is definitely showing a stronger tendency. Dealers are now being offered 17¢ per lb for lead.

Conversion Outlawed

Refiners will probably begin closing contracts for copper scrap at lower prices about the first of the year. Thus far there has been practically no new business since the NPA issued its scrap order on copper.

On Monday, the NPA amended M-16, the copper order, to make the ban on conversion or toll agreements effective immediately instead of Jan. 1. The rest of the order becomes effective as scheduled. NPA also announced that base period adjustments for aluminum users under Direction 1, M-7, for new business or products, changes after the base period, or shutdowns during the base period, will be continued through the first quarter of 1951.

Expect New Tin Order

As we go to press, NPA is expected to issue a tin conservation order which will probably cut back non-essential use of tin to 80 pct of the average monthly use during the first 6 months of 1950. End-use restrictions are also under consideration for this metal.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 20.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.32 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 43.5¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb. base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	74	58
Strip, cold-rolled	80	62
Rods and bars	70	56
Angles, hot-rolled	70	56
Plates	72	57
Seamless tubes	103	93
Shot and blocks	..	51

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheets	Rods	Extruded Shapes
Copper	41.03	....	40.63
Copper, h-r	....	36.88	....
Copper, drawn	....	38.18	....
Low brass	39.15	38.84	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.08	38.61	38.07
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.99
Ni silver, 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	32.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask f.o.b. New York	$118 to $125
Nickel, electro, f.o.b. New York	53.55
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	80.00
Tin, New York	$1.47
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	47.50
No. 215	44.50
No. 245	37.00
Yellow ingot	
No. 405	25.50
Manganese bronze	
No. 421	32.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	33.75-34.25
0.60 copper, max.	33.50-34.00
Piston alloys (No. 122 type)	31.50-32.00
No. 12 alum. (No. 2 grade)	30.75-31.25
108 alloy	31.25-31.75
195 alloy	32.75-33.25
13 alloy	34.00-34.50
ASX-679	31.25-31.75

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	32.50-33.00
Grade 2—92-95%	30.75-31.50
Grade 3—90-92%	30.00-30.50
Grade 4—85-90%	29.50-30.00

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39⅛
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34⅜
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79⅛

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ⅛¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22¼
Yellow brass	20⅛	18¾
Red brass	21½	20¾
Comm. bronze	21¾	21
Mang. bronze	19½	18⅝
Brass rod ends	19⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.00
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	18.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	21.00
No. 2 copper wire	20.00
Light copper	19.00
No. 1 composition	20.00
No. 1 comp. turnings	19.75
Rolled brass	16.50
Brass pipe	18.50
Radiators	15.25
Heavy yellow brass	15.00
Aluminum	
Mixed old cast	20
Mixed old clips	21
Mixed turnings, dry	19½
Pots and pans	20
Low copper	22½

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	19½—20
No. 2 heavy copper and wire	18 —18½
Light copper	17 —17¼
New type shell cuttings	17 —17¼
Auto radiators (unsweated)	12¾—13
No. 1 composition	16¼—16½
No. 1 composition turnings	15¾—16
Clean red car boxes	14¼—14½
Cocks and faucets	14¼—14½
Mixed heavy yellow brass	11 —11½
Old rolled brass	12½—13
Brass pipe	15¼—15½
New soft brass clippings	16 —16½
Brass rod ends	15 —15½
No. 1 brass rod turnings	14½—15
Aluminum	
Alum. pistons and struts	12½—13
Aluminum crankcases	15½—16
2S aluminum clippings	19 —19½
Old sheet and utensils	15½—16
Borings and turnings	13
Misc. cast aluminum	15½—16
Dural clips (24S)	15½—16
Zinc	
New zinc clippings	14½—15
Old zinc	11 —11¼
Zinc routings	8½— 9
Old die cast scrap	8 — 8¼
Nickel and Monel	
Pure nickel clippings	60 —65
Clean nickel turnings	57 —60
Nickel anodes	60 —65
Nickel rod ends	60 —65
New Monel Clippings	22 —25
Clean Monel turnings	18 —20
Old sheet Monel	20 —22
Inconel clippings	26 —28
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13
Lead	
Soft scrap, lead	15 —15¼
Battery plates (dry)	8¾— 9
Magnesium	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	85 —90
No. 1 pewter	63 —65
No. 1 auto babbitt	58 —60
Mixed common babbitt	12¼—12½
Solder joints	18½—19
Siphon tops	58 —60
Small foundry type	16¼—16½
Monotype	14¾—15
Lino. and stereotype	14½—14¾
Electrotype	12¾—13
Hand picked type shells	11½—11¾
Lino. and stereo. dross	8 — 8¼
Electro. dross	6½— 6¾

SCRAP *iron and steel*

markets
prices
trends

scrap centers turn attention to price conferences at capital . . . voluntary controls expected . . . cast grades show strength.

Attention of all scrap centers was on Washington this week. Voluntary price controls were expected for a beginning. Members of the American Iron and Steel Institute conferred with Price Administrator DiSalle last Monday and on Tuesday DiSalle met with members of the Institute of Scrap Iron and Steel.

The Pittsburgh market felt a lull pending Washington developments but scrap was still moving freely under the impetus of the higher price formula. The Chicago trade was awaiting price controls as prices of No. 1 heavy melting steel was selling for up to $45.50 a ton.

Dealers in Detroit were trying to cut down inventory in the face of coming price controls and shipments were at a high point. Production of car makers will continue to stir up demand in the market here and keep prices on the move up.

Cast was very strong in Philadelphia, New York, and Cleveland. In the Philadelphia area, pipe manufacturers came into the market with higher prices. Birmingham mills continued their resistance to the new formulas and bought nothing. Scrap from this district is being grabbed by out-of-the-area mills.

Scrap shipments in the Cleveland area were described as good but not sensational. Consumers were trying to build inventory. In Cincinnati all grades were moving freely as users tried to raise stocks. Dealers were willing to sell.

PITTSBURGH — The market settled down to a holiday lull as the industry looked to Washington for price action. This may take the form of voluntary control at the start. An American Iron & Steel Institute advisory committee met with government officials on Monday, and a similar group of the Institute of Scrap Iron & Steel was scheduled for a meeting the following day. Scrap was moving freely. Cast iron borings and No. 1 Machinery cast were stronger.

CHICAGO — An undercurrent of tension pervaded the Chicago scrap market this week as the trade anxiously awaited action on price controls. Meanwhile, there just doesn't seem to be enough No. 1 heavy melting steel to go around and brokers are offering anywhere from $44.50 to $46.50 per gross ton for it. No. 1 heavy melting prepared for foundry use is bringing over the mill price of $45. Unprepared free industrial No. 1 heavy melting which has also been recently sold over mill prices in the area. Consumer reaction to inferior shipments of short shoveling turnings is lessening demand for the item. Heavy breakable cast is stronger.

PHILADELPHIA — The market here is just about adjusted to the new formula level. Blast furnace grades are higher this week, as is low phos. No. 1 machinery cast is up to $62 to $63 and yard cast and heavy breakable are now quotable at $53 to $54 since the pipe manufacturers came into the market with higher prices. The market is very firm and higher prices are bringing out more light iron. The cold weather, however, is cutting into scrap operations in this area.

NEW YORK — Steelmaking scrap is moving more freely as the market opens up under new formula prices. There was still no spread in formula prices here. Last Tuesday in Washington officials of the Institute of Scrap Iron and Steel and the government had pricing talks. Cast was seething. No. 1 machinery cast moved to a ceiling of $53 and mixed yard cast to a top of $48.

DETROIT — As we go to press the Detroit market is still very strong. Shipments have peaked despite adverse weather, indicating the strong desire by dealers to cut down inventory in the face of a threatened price freeze. Most dealers in this area appear to be unloading. Present indications are that the car producers will continue to build at the highest production rate possible and this is expected to keep the fire under scrap prices here until some ruling out of Washington changes the picture.

CLEVELAND — Shipments are good but not sensational here and in the Valley. Prevailing opinion in the trade is that present prices are the top for the duration of the emergency. Consumers are trying to build up inventory with a long, cold, winter in prospect. Foundry grades are very strong.

ST. LOUIS — Several steel mills came into the market for No. 2 heavy melting steel at $1 higher than the preceding week. Foundry grades are higher as consumers cut deeply into inventories resulting from heavy shipments of their products. Conversion deals are also a factor in pushing up prices. The movement has been slowed down by cold weather and the strike of railroad switchmen.

CINCINNATI—All grades are in demand and moving freely at the formula here. District consumers are trying to build up additional inventory and dealers are shipping. Foundry grades are in demand but the market is less active than it was a month ago, A retrenchment which is not reflected in price.

BIRMINGHAM—No scrap steel is being bought by local mills and much of it is leaving the district. Birmingham area mills still are refusing to meet the formula, with the result that Northern and Eastern mills are getting the scrap from the Southeast that might be coming here. The cast market is continuing active, however, but with prices unchanged.

BOSTON—A rise of $1 a ton in No. 1 machinery cast, to set a price of $48 to $49 highlighted the market this week. Increased activity characterized the market generally, with scattered sales reported over the new formula price, especially in No. 1 heavy melting. Sellers were reported generally satisfied with the new prices.

CUMBERLAND GROUND SHAFTS

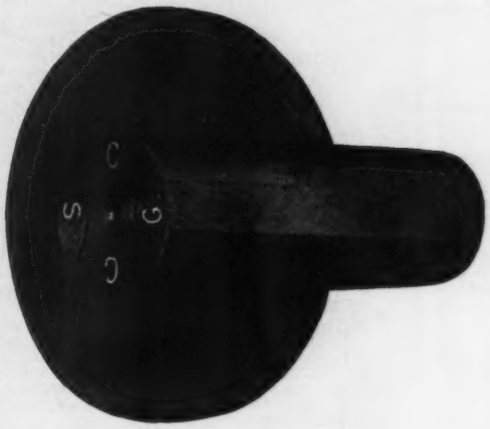
We manufacture 8" diameter, 7½",7", 6½", 6" and intermediate sizes down to and including 1⅛".

ON THE WEST VIRGINIA SHORE, OVERLOOKING THE POTOMAC RIVER, STANDS THE JAMES RUMSEY MONUMENT

The first practical steamboat in the world was run on the Potomac River a few miles below Cumberland, Maryland.

GEORGE WASHINGTON said in his diary, under date of September 6, 1784: "Remained at Bath all day and was showed the Model of a boat constructed by the ingenious Mr. Rumsey, for ascending rapid currents by mechanism; the principles of this were not only shown, and fully explained to me, but to my very great satisfaction, exhibited in practice in private under the injunction of secrecy——".

At a later date GEORGE WASHINGTON said in his diary: "Spent the afternoon with Mr. Rumsey and then Alexander Hamilton and I rode on to Cumberland, Maryland."



Symbol of Quality

Approximately 100 years after the exhibit of this steamboat, Cumberland began grinding shafts. They found through experience this was the best method by which accurate steel shafts could be produced. These shafts are so carefully ground that they are adapted for mass production where gears, pulleys, sprockets and bearings must slide on the shafts without delay due to filing or fitting.

IMMEDIATE SHAFTS

DISTRIBUTED BY

Baltimore, Maryland—Addison Clarke & Bro.
Boston, Mass.—Hawkridge Brothers Company
Boston, Mass.—Brown-Wales Company
Bridgeport, Conn.—Hunter & Havens, Inc.
Buffalo, New York—Jos. T. Ryerson & Son, Inc.
Charlotte, No. Carolina—Edgcomb Steel Co.
Chicago, Ill.—Central Steel & Wire Co.
Cincinnati, Ohio—Jos. T. Ryerson & Son, Inc.
Cleveland, Ohio—The Bissett Steel Company
Dayton, Ohio—Central Steel & Wire Co.
Detroit, Michigan—Central Steel & Wire Co.
Fort Worth, Texas—C. A. Fischer
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Indianapolis, Ind.—Tanner & Company
Jersey City, N. J.—Jos. T. Ryerson & Son, Inc.
Lakeland, Fla.—Mine & Mill Supply Co.
Los Angeles, Calif.—Link-Belt Co., Pacific Div.
Louisville, Ky.—Neill-LaVielle Supply Co.
Martinsburg, W. Va.—W. H. Heiston & Son
Montreal, Can.—Drummond, McCall & Co., Ltd.
Milwaukee, Wisconsin—Central Steel & Wire Co.
New Orleans, La.—R. J. Tricon Co.
New York City, N. Y.—Bright Steel Corp.
Oakland, Calif.—Link-Belt Co., Pacific Div.
Philadelphia, Pa.—Charles Bond Company
Philadelphia, Pa.—Horace T. Potts Co.
Pittsburgh, Pa.—McKee-Oliver, Inc.
Portland, Maine—W. L. Blake & Company
Portland, Oregon—Link-Belt Co., Pacific Div.
Providence, R. I.—Congdon & Carpenter Co.
San Francisco, Calif.—Link-Belt Co., Pacific Div.
Seattle, Wash.—Link-Belt Co., Pacific Div.
Spokane, Wash.—Link-Belt Co., Pacific Div.
Toronto, Canada—Drummond, McCall & Co., Ltd.
Worcester, Mass.—Pratt & Inman

CUMBERLAND STEEL COMPANY CUMBERLAND, MARYLAND, U. S. A.
ESTABLISHED 1845 INCORPORATED 1892

Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$45.75 to $46.50
No. 2 hvy. melting	43.75 to 44.50
No. 1 bundles	45.75 to 46.50
No. 2 bundles	42.75 to 43.50
Machine shop turn.	37.75 to 38.50
Mixed bor. and ms. turns.	37.75 to 38.50
Shoveling turnings	39.75 to 40.50
Cast iron borings	39.75 to 40.50
Low phos. plate	56.00 to 56.50
Heavy turnings	46.50 to 47.00
No. 1 RR. hvy. melting	45.75 to 46.50
Scrap rails, random lgth.	64.50 to 65.00
Rails 2 ft and under	68.00 to 69.00
RR. steel wheels	63.00 to 64.00
RR. spring steel	63.00 to 64.00
RR. couplers and knuckles	63.00 to 64.00
No. 1 machinery cast	67.50 to 68.00
Mixed yard cast.	57.50 to 58.00
Heavy breakable cast	52.50 to 53.00
Malleable	71.00 to 72.00

Chicago

No. 1 hvy. melting	$44.50 to $45.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 factory bundles	44.00 to 45.00
No. 1 dealers' bundles	44.00 to 45.00
No. 2 dealers' bundles	41.00 to 42.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	36.00 to 37.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Low phos. forge crops	55.00 to 57.00
Low phos. plate	52.00 to 55.00
No. 1 RR. hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	62.00 to 63.00
Rerolling rails	65.50 to 66.50
Rails 2 ft and under	67.00 to 69.00
Locomotive tires, cut	58.00 to 59.00
Cut bolsters & side frames	54.00 to 55.00
Angles and splice bars	63.00 to 64.00
RR. steel car axles	100.00 to 105.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast.	64.00 to 66.00
No. 1 agricul. cast.	61.00 to 62.00
Heavy breakable cast.	55.00 to 57.00
RR. grate bars	48.00 to 49.00
Cast iron brake shoes	52.00 to 53.00
Cast iron car wheels	58.00 to 59.00
Malleable	78.00 to 82.00

Philadelphia

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	38.00 to 39.00
Low phos. punchings, plate	50.00 to 51.00
Low phos. 5 ft and under	50.00 to 51.00
Low phos. bundles	48.00 to 49.00
Hvy. axle forge turn.	44.00 to 45.00
Clean cast chem. borings	42.00 to 43.00
RR. steel wheels	53.00 to 54.00
RR. spring steel	53.00 to 54.00
Rails 18 in. and under	66.00 to 67.00
No. 1 machinery cast.	62.00 to 63.00
Mixed yard cast.	53.00 to 54.00
Heavy breakable cast.	53.00 to 54.00
Cast iron carwheels	67.00 to 68.00
Malleable	69.00 to 70.00

Cleveland

No. 1 hvy. melting	$45.25 to $46.00
No. 2 hvy. melting	43.25 to 44.00
No. 1 busheling	45.25 to 46.00
No. 1 bundles	45.25 to 46.00
No. 2 bundles	42.25 to 43.00
Machine shop turn.	37.25 to 38.00
Mixed bor. and turn.	39.25 to 40.00
Shoveling turnings	39.25 to 40.00
Cast iron borings	39.25 to 40.00
Low phos. 2 ft and under	47.75 to 48.50
Steel axle turn.	44.25 to 45.00
Drop forge flashings	45.25 to 46.00
No. 1 RR. hvy. melting	46.00 to 46.50
Rails 3 ft and under	70.00 to 71.00
Rails 18 in. and under	72.00 to 73.00
No. 1 machinery cast.	69.00 to 70.00
RR. cast.	71.00 to 72.00
RR. grate bars	50.00 to 51.00
Stove plate	55.00 to 56.00
Malleable	76.00 to 77.00

Youngstown

No. 1 hvy. melting	$45.75 to $46.50
No. 2 hvy. melting	43.75 to 44.50
No. 1 bundles	45.75 to 46.50
No. 2 bundles	$42.75 to $43.00
Machine shop turn	37.75 to 38.50
Shoveling turnings	39.75 to 40.50
Cast iron borings	39.75 to 40.50
Low phos. plate	48.25 to 49.00

Buffalo

No. 1 hvy. melting	$44.50 to $45.25
No. 2 hvy. melting	42.50 to 43.25
No. 1 busheling	42.50 to 43.25
No. 1 bundles	43.50 to 44.25
No. 2 bundles	41.50 to 42.25
Machine shop turn.	36.50 to 37.25
Mixed bor. and turn.	36.50 to 37.25
Shoveling turnings	38.50 to 39.25
Cast iron borings	36.50 to 37.25
Low phos. plate	48.25 to 49.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	60.00 to 61.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	60.00 to 61.00
No. 1 machinery cast.	55.00 to 56.00
No. 1 cupola cast.	52.00 to 53.00
Small indus. malleable	60.00 to 61.00

Birmingham

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	27.00 to 28.00
Bar crops and plate	46.00 to 47.00
Structural and plate	46.00 to 47.00
No. 1 RR. hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	58.00 to 59.00
Rerolling rails	61.00 to 62.00
Rails 2 ft and under	66.00 to 67.00
Angles & splice bars	59.00 to 60.00
Std. steel axles	61.00 to 62.00
No. 1 cupola cast.	59.00 to 60.00
Stove plate	54.00 to 55.00
Cast iron carwheels	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$45.00 to $47.00
No. 2 hvy. melting	41.00 to 42.00
No. 2 bundled sheets	40.00 to 41.00
Machine shop turn.	28.50 to 29.50
Shoveling turnings	35.00 to 36.00
Rails, random lengths	58.00 to 59.00
Rails 3 ft and under	66.00 to 68.00
Locomotive tires, uncut	57.00 to 58.00
Angles and splice bars	66.00 to 68.00
Std. steel car axles	100.00 to 105.00
RR. spring steel	57.00 to 58.00
No. 1 machinery cast.	65.00 to 66.00
Hvy. breakable cast.	56.00 to 58.00
Cast iron brake shoes	55.00 to 57.00
Stove plate	53.00 to 55.00
Cast iron car wheels	63.00 to 65.00
Malleable	55.00 to 57.00

New York

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 2 bundles	36.00
Machine shop turn.	31.00
Mixed bor. and turn.	31.00
Shoveling turnings	33.00
Clean cast chem. bor.	$38.00 to 39.00
No. 1 machinery cast.	52.00 to 53.00
Mixed yard cast.	47.00 to 48.00
Charging box cast.	47.00 to 48.00
Heavy breakable cast.	46.00 to 47.00
Unstrp. motor blocks	42.00 to 43.00

Boston

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$35.67
No. 2 hvy. melting	33.67
No. 1 bundles	38.00
No. 2 bundles	$32.67
Machine shop turn.	27.67
Mixed bor. and turn.	$26.67 to 27.67
Shoveling turnings	29.67
No. 1 busheling	35.67
Clean cast chem. borings	33.00 to 34.00
No. 1 machinery cast.	48.00 to 49.00
Mixed cupola cast.	44.00 to 45.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	42.00 to 43.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$40.25 to $44.00
No. 2 hvy. melting	38.25 to 41.50
No. 1 bundles	40.25 to 48.00
New busheling	40.25 to 47.00
Flashings	40.25 to 45.00
Machine shop turn.	32.25 to 33.00
Mixed bor. and turn.	32.25 to 32.75
Shoveling turnings	34.25 to 35.00
Cast iron borings	34.25 to 35.00
Low phos. plate	42.75 to 48.00
No. 1 cupola cast.	58.00 to 60.00
Heavy breakable cast.	49.00 to 51.00
Stove plate	48.00 to 50.00
Automotive cast.	62.00 to 64.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$44.25
No. 2 hvy. melting	42.25
No. 1 bundles	44.25
No. 2 bundles, black	42.25
No. 2 bundles, mixed	41.25
Machine shop turn.	33.00
Mixed bor. and turn.	34.00
Shoveling turnings	34.00
Cast iron borings	34.00
Low phos.-steel	46.75
Low phos. 18 in. under	62.00
Rails, random lengths	$62.00 to 63.00
Rails, 18 in. and under	72.00 to 73.00
No. 1 cupola cast.	65.00 to 66.00
Hvy. breakable cast.	59.00 to 60.00
Drop broken cast.	71.00 to 72.00

San Francisco

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	30.00
No. 2 bundles	28.00
No. 3 bundles	25.00
Machine shop turn.	16.00
Elec. fur. 1 ft and under	$40.00 to 42.50
No. 1 RR. hvy. melting	30.00
Scrap rails random lgth.	30.00
No. 1 cupola cast.	43.00 to 46.00

Los Angeles

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	30.00
No. 2 bundles	28.00
No. 3 bundles	25.00
Mach. shop turn.	16.00
Elec. fur. 1 ft and under	$42.00 to 45.00
No. 1 RR. hvy. melting	30.00
Scrap rails, random lgth.	30.00
No. 1 cupola cast.	52.00

Seattle

No. 1 hvy. melting	$28.00
No. 2 hvy. melting	28.00
No. 1 bundles	22.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Elec. fur. 1 ft and under	$40.00 to 45.00
RR. hvy. melting	39.00
No. 1 cupola cast	45.00

Hamilton, Ont.

No. 1 hvy. melting	$30.00
No. 1 bundles	30.00
No. 2 bundles	29.50
Mechanical bundles	28.00
Mixed steel scrap	26.00
Mixed bor. and turn.	23.00
Rails, remelting	30.00
Rails, rerolling	32.00
Bushelings	24.50
Bush., new fact. prep'd.	29.00
Bush., new fact, unprep'd.	23.00
Short steel turnings	23.00
Cast scrap	45.00

shoveling turnings

use:

Turnings of this type are a leading grade of industrial and factory scrap used in blast furnaces and open hearths. Since long turnings tend to clog the charging bell of blast furnaces or make charging into the open hearth more difficult, they are frequently processed through crushing machines. Crushed turnings make a more economical charge because they load heavier, and serve to fill up the interstices in heavier steel scrap.

source:

Machining operations on steel produce shavings from which shoveling turnings are processed.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

Shoveling Turnings. Clean short steel or wrought iron turnings, drilling or screw cuttings. May include any such material whether resulting from crushing, raking or other processes. Must be free of springy, bushy, tangled or matted material, lumps, non-ferrous metals in a free state, scale, grindings, or excessive oil.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

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BIRMINGHAM, ALA. Empire Building	CHICAGO, ILLINOIS 100 W. Monroe St.	HOUSTON, TEXAS 1114 Texas Av. Bldg.	PITTSBURGH, PA. Oliver Building
BOSTON, MASS. Statler Building	CLEVELAND, OHIO 1022 Midland Bldg.	LEBANON, PENNA. Luria Building	PUEBLO, COLORADO 334 Colorado Bldg.
BUFFALO, N. Y. Genesee Building	DETROIT, MICHIGAN 2011 Book Building	NEW YORK, N. Y. Woolworth Building	READING, PENNA. Luria Building

ST. LOUIS, MISSOURI
2110 Railway Exchange Bldg.

SAN FRANCISCO, CALIFORNIA
Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Dec. 19, 1950	Dec. 12, 1950	Nov. 21, 1950	Dec. 20, 1949
Hot-rolled sheets	3.60	3.60	3.35	3.25
Cold-rolled sheets	4.35	4.35	4.10	4.00
Galvanized sheets (10 ga)	4.80	4.80	4.40	4.40
Hot-rolled strip	3.50	3.50	3.25	3.25
Cold-rolled strip	4.75	4.75	4.21	4.038
Plate	3.70	3.70	3.50	3.40
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	34.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. ternes	6.35	6.35	6.35	6.65
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.45	3.35
Cold finished bars	4.55	4.55	4.15	3.995
Alloy bars	4.30	4.30	3.95	3.75
Structural shapes	3.65	3.65	3.40	3.25
Stainless bars (No. 302)	31.25	31.25	30.00	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.50	4.15
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.40	$3.20
Light rails	4.00	4.00	3.75	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$54.00	$52.00
Slabs, rerolling	56.00	56.00	54.00	52.00
Forging billets	66.00	66.00	63.00	61.00
Alloy blooms billets, slabs	70.00	70.00	66.00	63.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	3.85	3.40
Skelp	3.35	3.35	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	Dec. 19, 1950	Dec. 12, 1950	Nov. 21, 1950	Dec. 20, 1949
No. 2, foundry, del'd Phila.	$57.77	$57.77	$54.77	$50.42
No. 2, Valley furnace	52.50	52.50	49.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	52.58	46.08
No. 2, Birmingham	48.88	48.88	45.88	39.38
No. 2, foundry, Chicago†	52.50	52.50	49.50	46.50
Basic del'd Philadelphia	56.92	56.92	53.92	49.92
Basic, Valley furnace	52.00	52.00	49.00	46.00
Malleable, Chicago†	52.50	52.50	49.50	46.50
Malleable, Valley	52.50	52.50	49.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	181.20	181.20	181.20	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	*$46.13*	$46.25	$43.75	$29.75
Heavy melt'g steel, Phila.	44.50	44.50	38.75	24.50
Heavy melt'g steel, Ch'go	44.75	44.50	39.75	26.50
No. 1 hy. com. sh't, Det.	44.13	43.13	41.25	26.50
Low phos. Young'n	48.63	48.63	46.25	31.75
No. 1 cast, Pittsburgh	67.75	66.75	60.75	38.50
No. 1 cast, Philadelphia	62.50	59.50	55.50	38.00
No. 1 cast, Chicago	65.00	65.00	61.50	38.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.00
Foundry coke, prompt	17.25	17.25	16.75	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin Straits, New York	$1.47†	$1.395*	$1.44	78.25
Zinc, East St. Louis	17.50	17.50	17.50	9.75
Lead, St. Louis	16.80	16.80	16.80	11.80
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	51.22	51.22	51.22	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	32.00	32.00	32.00	32.00

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Dec. 19, 1950	4.131¢ per lb.	$52.69 per gross ton	$45.13 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	45.08 per gross ton
One month ago	3.837¢ per lb.	49.69 per gross ton	40.75 per gross ton
One year ago	3.835¢ per lb.	45.88 per gross ton	26.92 per gross ton

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	$52.69 Dec. 12	$45.88 Jan. 3	$45.13 Dec. 19	$26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jar. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07542¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 9

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$69.00[31]
Alloy, net ton	$70.00[1,17]	$70.00[1,4]	$70.00[1]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[31]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[18]	4.10[2,4,33]	4.10[6]	4.10[2]			4.10[6]				4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[28]	3.60[8,23]	3.60[1,6,8]	3.60[4]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[26]		3.60[3]		3.80[12] 4.40[47]
Cold-rolled	4.35[1,5,9,15] 5.35[53]		4.35[1,6,8]	4.35[4]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]		4.55[12]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	6.00[64]					4.80[3]		
Enameling (12 gage)	4.65[1]		4.65[1,8]			4.65[7]								
Long ternes (10 gage)	5.20[9,15]						6.00[64]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,8] 5.90[6]	5.40[4]			5.40[1,4,13]		5.40[3]	5.65[26]		5.40[3]		
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,8] 7.05[6]	6.55[4]			6.55[4]		6.55[3]			6.55[3]		
Hi str. low alloy, galv.	7.20[1]													
STRIP Hot-rolled	3.60[9], 4.00[41,58] 3.75[28] 3.50[5]	3.50[44]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]		3.80[3]		4.40[47]
Cold-rolled	4.65[5,9] 5.00[28] 5.35[53,40,58]	4.90[8,66]	4.90[6]	4.65[2]		4.65[7]	4.65[4,6] 5.35[13]		4.65[3]			4.65[3]		5.45[47] 5.60[68] 5.60[61]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[6] 5.80[6]				4.95[4], 5.50[1] 5.40[13]			5.55[26]				
Hi str. low alloy, c.r.	7.20[9]			6.70[5]			6.20[4], 6.55[12]							
TINPLATE† Coke, 1.50-lb base box 1.25 lb, deduct 20¢	$7.50[1,5,9,15]		$7.50[1,6,8]				$7.50[4]					7.60[3]	$7.70[22]	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[15]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,33]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[21] 4.70[64]
Reinforcing‡	3.70[1,5]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,69,71]	4.55[2,69,70,73,73]	4.55[74,73]	4.55[2]	4.55[4,53]									
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,33]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[3]	4.30[3,4]		4.30[3]			4.45[21]
Alloy, cold-drawn	5.40[17,52,69,71]	5.40[4,33,69,70,73]	5.40[4] 5.90[74]		5.40[4,53]			5.40[3]	5.40[3]					5.55[54]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,8] 6.05[6]	5.55[4]			5.55[1]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15]	3.70[1]	3.70[1,6,8]	3.70[4] 4.00[9]			3.70[1,4] 3.95[12]		3.70[3]	4.15[26]	3.70[3]	3.70[3]		
Floor plates			4.75[6]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,8]	5.65[4,5]			5.65[4] 5.70[13]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,23]	3.65[1,8]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,5]					5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[15]	4.85[2] 4.33		4.85[3]				Kokomo—5.80[39]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[6]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS carbon forging, net ton
	$82.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$66.00[11]	F=$85.00[19] SF, LA, S=$85.00[83]		Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19,94] LA=$90.00[83]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[3] LA=4.90[94,52]	Worcester=4.40[3] Minnequa=4.35[14]	WIRE RODS
		3.60[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[84], Geneva=3.70[16]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4, 11]	SF, LA=5.55[24]	Ashland=4.80[7]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4]	SF, LA=4.25[24,52] F=475[19], S=4.50[83]	Atlanta=4.05[85] Minnequa=4.55[14]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[3], 5.85[88]	Cold-rolled
		5.30[11]	F=6.70[19]		Hi str. low alloy, h.r.
					Hi str. low alloy, c.r.
		7.80[11]	SF=8.25[24]		TINPLATE Cokes, 1.50-lb base box 1.25 lb. deduct 20¢
Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4, 11]	SF, LA=4.40[24]	Atlanta=4.25[85] Minnequa=4.15[14]	BARS Carbon steel
4.30[83]	4.10[83]	3.70[4, 11]	SF, S=4.45[52] F=4.40[19]	Atlanta=4.25[85] Minnequa=4.50[14]	Reinforcing‡
				Putnam, Newark=4.95[89] Hartford=5.10[4] Los Angeles=6.00[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[83] F=5.35[19]		Alloy, hot-rolled
				Newark=5.70[89] Worcester= [3] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4, 11]	F=4.30[19] S=4.60[52] Geneva=3.70[16]	Claymont=4.15[29] Coatesville=4.15[21] Minnequa=4.50[14]	PLATE Carbon steel
				Harrisburg=5.25[33]	Floor plates
			F=5.70[19] Geneva=5.65[16]	Coatesville=5.25[21]	Alloy
		5.65[11]	F=6.25[19]		Hi str. low alloy
4.25[83]	4.05[83]	3.85[4,11]	SF=4.20[83] F=4.25[16] LA=4.25[24,63] S=4.30[83]	Geneva 3.85[16] Minnequa 4.10[14]	SHAPES, Structural
		50[11]	F=6.10[19]		Hi str. low-alloy
5.45[83]	5.25[83]	4.85[4, 11]	SF, LA=5.80[24]	Atlanta=5.10[85] Worcester=5.15[3] Minnequa=5.10[14]	MANUFACTURERS' WIRE Bright

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Steel & Wire Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	318	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	18.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.25	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	38.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.00	32.25	30.00	48.25	38.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa. 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb.	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.40			8.60	4.50	
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.25	8.60	4.50	
Johnstown-3		4.00			5.60	8.60		
Joliet-1		4.00	4.70					
Kansas City-83				6.40				
Lackawanna-3	3.60	4.00	4.70			8.60	4.50	
Lebanon-3				6.15				9.60
Minnequa-14	3.60	4.50	4.70	6.15		8.60	4.50	9.60
Pittsburgh-77						9.35		9.60
Pittsburgh-78								9.60
Pittsburgh-5				6.15				
Pittsburg-24							4.65	
Seattle-62				6.10			4.35	
Steelton-3	3.60		4.70				4.50	
Struthers-6				5.60				
Torrance-24							4.65	
Youngstown-4				6.15				

Track Bolts, heat treated, to railroads, 9.85¢ per lb.

BOILER TUBES

Seamless steel, electric welded commercial boiler tubes, locomotive tubes, minimum wall, per 100 ft at mill, o.l. lots, cut lengths 10 to 24 ft.

OD in in.	gage BWG	Seamless H.R.	Seamless C.D.	Electric Weld H.R.	Electric Weld C.D.
2	13	$22.67	$26.66	$21.99	$25.86
2½	12	30.48	35.84	29.57	34.76
3	12	33.90	39.90	32.89	34.30
3½	11	42.37	49.89	41.10	48.39
4	10	52.60	61.88	51.03	60.03

Pittsburgh Steel add, H-R: 2 in., 63¢; 2½ in., 84¢; 3 in., 92¢; 3½ in., $1.17; 4 in., $1.45. Add, C-R: 2 in., 74¢; 2½ in., 99¢; 3 in., $1.10; 3½ in., $1.37; 4 in., $1.70.

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more $41.00
60% or less 38.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Gal. Barbed Wire Base Col.	Merch. Wire Ann'ld. ¢/lb.	Merch. Wire Gal. ¢/lb
Alabama City-4	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa.-5	118	132	....	....	136	140	5.70	6.15
Atlanta-65	113	133	....	126	126	143	5.95	6.40
Bartonville-34	118	130	140	123	143	143	5.95	6.15
Buffalo-85	....	....	....	....	....	....	....	....
Chicago-4	118	126	121	123	....	136	....	....
Cleveland-86	....	....	....	....	....	....	....	....
Cleveland-2	....	....	....	....	....	....	5.70	5.85
Crawfordsville-87	....	130	....	....	....	....	....	....
Donora, Pa.-2	118	130	....	123	....	140	5.70	5.85
Duluth-2	118	130	....	123	....	140	5.70	5.85
Fairfield, Ala.-11	118	126	....	123	....	136	5.70	5.95
Houston-83	126	138	....	....	....	148	6.10	6.55
Johnstown, Pa-3	118	130	....	....	140	....	5.70	6.15
Joliet, Ill.-2	118	130	....	123	....	140	5.70	5.85
Kokomo, Ind.-30	120	128	....	125	138	138	5.80	6.05
Los Angeles-62	....	....	....	....	....	....	....	....
Kansas City-83	130	130	142	135	....	152	6.30	6.75
Minnequa-14	123	138	130	128	148	148	5.95	6.45
Monessen-18	124	135	....	....	....	145	5.95	6.40
Moline, Ill.-4	....	....	121	....	....	....	....	....
Palmer-85	....	....	....	....	....	....	....	....
Pittsburg, Cal.-24	137	149	....	147	156	....	6.65	6.80
Portsmouth-20	124	137	....	....	147	147	6.10	6.60
Rankin, Pa.-2	118	130	....	....	....	140	5.70	5.85
San Francisco-14	....	....	....	....	....	....	....	....
So.Chicago, Ill.-4	118	126	116	123	....	136	5.70	5.95
So. San Francisco-14	....	....	....	147	....	160	6.65	7.10
Sparrows Pt.-3	120	....	....	125	142	132	5.80	6.25
Sterling, Ill.-33	118	130	140	123	140	140	....	....
Struthers, Ohio-6	....	....	....	....	....	....	....	....
Torrance, Cal.-24	138	....	....	....	....	....	6.65	....
Worcester-2	124	....	....	....	....	....	6.00	6.15
Williamsport, Pa.-51	....	....	....	....	....	....	....	....

Cut Nails, carloads, base, $6.75 per 100 lb. (less 20¢ to jobbers) at Conshohocken, Pa., (26), Wareham, Mass. (53) Wheeling, W. Va., (15).

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago. $105.30 to $108.80
6 to 24-in., del'd N. Y.... 104.50 to 105.50
6 to 24-in., Birmingham . 91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less ..... $108.50 to $113.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Ga
STANDARD T. & C.																				
Bethlehem-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	21.0	31.5	22.0	32.0	12.5	32.5	13.0	....	....	....	....	....	
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	
Toledo-86	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	
Wheatland-89	36.0	14.0	38.0	17.0	39.5	19.5	40.5	20.5	40.5	21.0	41.0	21.5	42.0	22.5	....	....	....	....	....	
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Bethlehem-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	
Oakland-19	24.5	4.0	28.5	18.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	
Pittsburgh	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.0	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	....	....	....	....	....	
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	
Toledo-86	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	
Wheatland-89	34.0	13.5	38.0	17.5	38.5	19.5	39.5	20.5	39.5	21.0	40.0	21.5	41.0	22.5	....	....	....	....	....	
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 20¢ to base price except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul (*), add 15¢; Philadelphia, add 25¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140 Ann.
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	....	5.95	5.70	5.55	....	....	....	....	....
Boston	6.20	7.00	7.74–8.29	6.15	8.59[16]	6.49–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.93–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74	5.86	....	6.05	5.80	5.60	6.40	10.15	10.45	11.89	11.93–12.10
Chicago*	5.60	6.40	8.09 7.75	5.55	....	5.80	5.70	5.55	6.45 6.30	10.85 9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	....	6.19	6.09	5.83	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	8.93	5.92	5.82	5.57	6.40	9.91	10.21	11.58	11.83
Detroit	5.78	6.53	7.89	5.94	....	5.93	6.09	5.84	6.56	10.11	10.41	11.73	12.03
Houston	7.00	8.25	....	....	....	6.85	6.50	6.65	9.35	10.35	11.25	....	12.75
Indianapolis	....	....	....	....	....	....	....	....	....	....	....	....	....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	8.70[16]	6.40	6.35	6.35	7.55	11.30	11.30	13.20	13.50
Memphis	6.33	7.08	....	6.38	....	6.43	6.33	6.08	7.16	....	....	....	....
Milwaukee	5.74	6.54	7.89	5.69–6.59	....	5.94	4.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	....	....	....	....	....	....	....	....	....	....	....	....	....
New York	5.97–6.27	7.54[1]	8.44[2]	6.59–7.19	8.93[16]	6.53–6.88	6.40	6.42	7.23	10.33–10.45	10.65–10.75	12.00–12.10	12.50–12.40
Norfolk	6.50[13]	....	....	....	....	6.53[13]	6.60[13]	6.55[13]	....	....	....	....	....
Philadelphia*	6.00	6.80	8.00	6.10	....	6.05	5.90	6.05	6.83	10.15	10.45	....	....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60	....	8.50	7.30	....	6.80	6.95	6.90	....	....	....	....	....
Salt Lake City	7.95	....	9.70	8.70	....	8.05	8.30	8.65	9.00	....	....	....	....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	....	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	....	8.75	6.65	6.75	9.05	....	....	....	....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.03[16]–8.23	6.13	6.03	5.80	6.53–6.63	10.05	10.35	11.70	12.00
St. Paul	6.16	6.96	8.31	6.11	....	6.33	6.28	6.11	6.93	10.38	10.68	12.01	12.31

BASE QUANTITIES *(Standard unless otherwise keyed on prices.)*
Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets; 2000 to 9999 lb. Cold-finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	54.00	54.50	55.00	55.50	.....
Birmingham	48.38	48.88	.....	.....	.....
Buffalo	52.00	52.50	53.00	.....	.....
Chicago	52.00	52.50	52.50	53.00	.....
Cleveland	52.00	52.50	52.50	53.00	57.00
Daingerfield, Tex.	48.00	48.50	48.50	.....	.....
Duluth	52.00	52.50	52.50	53.00	.....
Erie	52.00	52.50	52.50	53.00	.....
Everett	.....	52.25	52.75	.....	.....
Fontana	58.00	58.50	.....	.....	.....
Granite City	53.90	54.40	54.90	.....	.....
Hubbard	52.00	52.50	52.50	.....	.....
Ironton, Utah	52.00	52.50	.....	.....	.....
Pittsburgh	52.00*	.....	.....	53.00	.....
Neville Island	52.00	52.50	52.00	53.00	.....
Geneva, Utah	52.00	52.50	.....	.....	.....
Sharpsville	52.00	52.50	52.50	53.00	.....
Steelton	54.00	54.50	55.00	55.50	60.00
Swedeland	56.00	56.50	57.00	57.50	.....
Toledo	52.00	52.50	52.50	53.00	.....
Troy, N. Y.	54.00	54.50	55.00	.....	60.00
Youngstown	52.00	52.50	52.50	53.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos
Boston	Everett	$.60-.80	.....	52.85–53.05	53.55–53.75	.....	.....
Boston	Steelton	6.90	.....	.....	.....	.....	66.90
Brooklyn	Bethlehem	4.29	.....	58.79	59.29	59.29	.....
Cincinnati	Birmingham	6.70	55.08	55.58	.....	.....	.....
Jersey City	Bethlehem	2.83	.....	57.13	57.63	58.13	.....
Los Angeles	Geneva-Ironton	7.70	59.70	60.20	.....	.....	.....
Los Angeles	Fontana	.....	59.70	60.20	.....	.....	.....
Mansfield	Cleveland, Toledo	3.33	55.33	55.83	55.83	56.33	60.33
Philadelphia	Bethlehem	2.39	58.39	58.89	57.39	57.89	.....
Philadelphia	Swedeland	1.44	57.44	57.94	58.44	58.94	.....
Philadelphia	Steelton	3.09	57.09	57.59	58.09	58.59	63.09
Rochester	Buffalo	2.63	54.63	55.13	55.63	.....	.....
San Francisco	Geneva-Ironton	7.70	59.70	60.20	.....	.....	.....
San Francisco	Fontana	.....	59.70	60.20	.....	.....	.....
Seattle	Geneva-Ironton	7.70	59.70	60.20	.....	.....	.....
Seattle	Fontana	.....	59.70	60.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	51.65	52.15	52.65	.....	.....
Syracuse	Buffalo	3.58	55.58	56.08	56.58	.....	.....

* *Monessen, $54.00.*

Producing points prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$62.50; f.o.b. Buffalo, $63.75. Add $1.50 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $62.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $70.50. High phosphorus charcoal pig iron is not being produced.

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List	
	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List			
	Less Keg (Reg.)	K.	Less Keg. (Hvy.)	K.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

	Pct Off List
Packaged, steel, plain finished	56—10
Packaged, plated finish	41—10
Bulk, plain finish**	67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb
½ in. & larger	$7.85
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	7.70

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	17.00¢
8 to 16	48, 60, 72	17.00¢
7	48, 60	18.64¢
6	48, 60	19.95¢
4, 5	40	20.48¢
3	40	21.53¢
2½	24, 30	22.05¢
2	24, 30	24.15¢
	CARBON	
40	100, 110	7.65¢
35	65, 110	7.65¢
30	65, 84, 110	7.65¢
24	72 to 104	7.65¢
20	84, 90	7.65¢
17	60, 72	7.65¢
14	60, 72	8.16¢
10, 12	60	8.42¢
8	60	8.67¢

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct. Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.10
18	4	1	—	5	$1.72
18	4	2	—	—	$1.245
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	84¢
High-carbon chromium					63.5¢
Oil hardened manganese					35¢
Special carbon					32.5¢
Extra carbon					27¢
Regular carbon					23¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb.
Armature	*6.75
Electrical	*7.25
Motor	*8.50
Dynamo	9.30
Transformer 72	9.85
Transformer 65	10.40
Transformer 58	11.10
Transformer 52	11.90

PRODUCING POINTS—Beech Bottom, W. Va., 15; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22*, add 70¢; Indiana Harbor, Ind., 3; Mansfield, Ohio, 75; Niles, Ohio, 64, add 30¢; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.00 to $17.50
Foundry, oven coke	
Buffalo, del'd	$25.35
Chicago, f.o.b.	21.00
Detroit, f.o.b.	23.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Plainesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	21.00
St. Louis, f.o.b.	24.90
Birmingham, del'd	20.79

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	5.35¢
0.41 to 0.60 carbon	6.30¢
0.61 to 0.80 carbon	7.40¢
0.81 to 1.05 carbon	9.35¢
1.06 to 1.35 carbon	11.65¢

Worcester, add 0.30¢; Sharon, Carnegie, New Castle, add 0.35¢; Detroit, 0.26 to 0.40 carb., add 25¢; other grades add 15¢. New Haven, 0.26 to 0.40 carb., add 50¢; other grades add 5¢.

REFRACTORIES

Fire Clay Brick *(F.o.b. works)*

	Carloads, Per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	83.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	8.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.75

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester	$77.00

Magnesite Brick

Standard, Baltimore	$99.00
Chemically bonded, Baltimore	88.00

Grain Magnesite *St. %-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.30

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.35
Aluminum	39.0¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.25¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	6.5¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	34.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	$4.15
Zinc, 10 ton lots	20.50¢ to 23.85¢

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr. 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si			22.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C	$1.09
0.50% max. C	1.05
.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 43 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	75.00	76.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	29.75
Ton lots	31.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn ..... 19.15¢

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd., Mn. 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si	21.25	23.10	24.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	11.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $89.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $83.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	19.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.15¢
Ton lots	9.55¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.15
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.	
Ton lots	$4.90
Less ton lots	4.95
Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	$3.75
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.32
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.35
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.50
Less ton lots	$1.55
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$177.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$3.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	$3.00-$3.05
Crucible	3.10- 3.15
High speed steel (Primos)	3.25
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.13
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk, lump	11.00¢
Ton lots, bulk lump	11.50¢
Less ton lots, lump	12.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.28
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	7.00¢

Boron Agents

Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$4.35
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound	10.00¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	$1.20
F.o.b. Wash., Pa.; 100 lb, up	
10 to 14% B	.75
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	$1.00
No. 6	68¢
No. 79	50¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.46
Less ton lots	1.57
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢

CLEARING HOUSE

NEWS OF USED, REBUILT AND SURPLUS MACHINES

Detroit Activity Slows—The Detroit used machinery market is spotty at the moment. Unless recent events in Korea provide a shot in the arm, a number of Detroit firms are anticipating a relatively slow market in the next few weeks. Inquiries are continuing at a high rate, indicative of continuing interest.

But the amount of actual buying is not matching the rate of inquiries, at the moment. But the possibility that a market rush may develop in the wake of the Korean crisis is not being overlooked by the trade here.

Prices Remain High—Talk of possible price control seems to have quieted down in the Detroit area. However, the lull in market activity has not resulted in any slackening of prices, indicating the underlying strength of the market. An auction sale at Hupp Manufacturing Co. recently is a good example. Price paid for the 300 assorted types of machines, mostly very old, were, in the words of would-be buyers, "up in the stratosphere." Another price example is even plainer.

A few months ago, a Warner and Swasey No. 5 of recent vintage sold for about $2200. Last week, the same machine sold for $9600. This experience, it is reported, is being duplicated for other types of equipment, especially types made scarce by government or defense industry buying.

Defense Activity Low—There is only limited defense activity in the Detroit market at the present time. This has permitted some of the pressure on the market to remain easy. Some buying for the Cadillac tank plant and the military engine programs of General Motors Diesel and Continental Motors has been reported, but this is practically the total extent of the buying which can be traced directly to defense production. Up to the present, the Detroit Tank Arsenal has not been reported as doing much buying. However, a sharp pickup in government activity is anticipated.

Detroit MDNA Meets—The Detroit Chapter of the Machinery Dealers' National Assn. held its November meeting at the Machinery Liquidating Co., 2300 E. Warren Avenue. Featured speakers were Frank Laurens, national president of the MDNA, J. M. P. Fox, MDNA executive secretary, and Harvey Goldman of the local chapter.

These speakers reported on the recent meeting of representatives of the machine tool builders, machine tool dealers, and used machinery dealers, with representatives of the National Production Authority at Ottawa, Canada. The annual Christmas party of the Detroit Chapter was held Dec. 14.

NISA Convention—Final plans for the 1951 national convention of the National Industrial Service Association were completed at the December 1 meeting of the Southwestern Chapter in San Antonio. It is expected that several hundred electric motor repair shops will be represented at this convention, to be held April 15 to 18 at the Plaza Hotel, San Antonio, Texas.

The convention theme, "Buy and Sell, Produce, and Profit," will be reflected in convention papers, and in the round table discussions and forums to be held on two of the afternoons. Exhibits of equipment, supplies, and accessories will be a feature of the convention. The banquet speaker will be Fred Smith, vice-president, industrial relations, of the William Powell Co., Cincinnati. The convention has been timed to coincide with San Antonio's famed Fiesta San Jacinto, which will supplement the planned entertainment for convention visitors.